# Pit and Quarry

With which is consolidated CEMENT-MILL & QUARRY

Member Audit Bureau of Circulations

Read in Largest Number of Plants

Vol. XXII May 6, 1931 No. 3


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*Next Issue May 20, 1931*


Published bi-weekly on Wednesday for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other nonmetallic minerals. Entered as second-class matter October 9, 1928, at the Postoffice at Chicago, Ill., under the Act of March 3, 1879.



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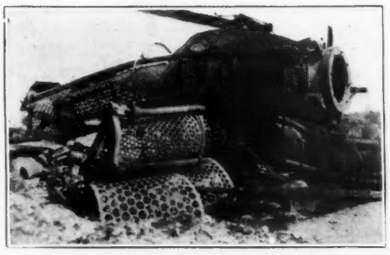
Vol. XXII CHICAGO, MAY 6, 1931 No. 3

## Crushed-Stone Plant Destroyed by Flames

### DAMAGE IS PLACED AT $250,000

The crushed-stone plant of the Consumers Co., near Lemont, Ill., a Chicago suburb, was entirely destroyed by fire early on the morning of April 14. The fire, the origin of which is unknown, caused an estimated damage of $250,000.

The fire started in the screen building and was first noticed at 2:15 a. m. by the night watchman and passersby. An alarm was sent in immediately but in spite of the fact that fire apparatus from a number of neighboring towns fought the blaze and that an ample supply of water was available from a nearby canal the fire had gained too

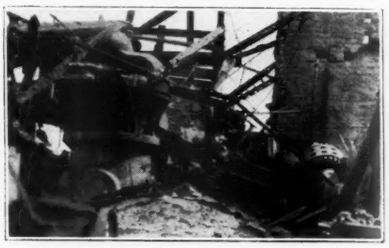


Some of the revolving screens as they looked after the fire.

great headway and could not be checked.

The plant was in two units, both of which were destroyed. One unit, containing the original crushing, screening and storage departments, was built about 30 years ago. This was rebuilt and modernized from time to time and was entirely rebuilt and enlarged about 12 years ago. At that time the second unit, consisting of a screening and washing plant, was built. The machine and blacksmith shop adjoining these buildings was also destroyed.

What was left of the machine and blacksmith shop.



The 18-in. primary gyratory crusher surrounded by wreckage.

During the past winter improvements had been made at an expense of $10,000. The plant had just completed a 9-hr. run, its first day's operation of the 1931 season, before the fire took place. The plant was of stone, concrete, and timber construction and had a capacity of over 200 tons per hour. There will be practically no salvage as all of the screens, crushers, conveyors and other machinery were entirely warped and melted by the intense heat. The equipment included eight gyratory crushers, two revolving screens, five vibrating screens and other machinery.

The only items not damaged by the blaze were the quarry shovels, well drills, locomotives and cars, a locomotive crane used for rehandling material, and a truck-loading batcher bin. The plant office, located 30 ft. east of the plant, was not damaged.

Fortunately more than 100,000 tons of sized material was stock-piled at the time. This is being loaded into trucks for shipment by the locomotive crane at the rate of 1,500 tons per day.

The company owns 250 acres of limestone deposit with a known depth of 160 ft. although the quarry face is now only 50 ft. in depth. Because of the value of this deposit and its proximity to a good market the plant will probably be rebuilt.

## Wisconsin Spurns State Cement-Plant Proposal

A bill providing for the appointment of a committee to investigate the feasibility of a state-owned plant for the manufacture of Portland cement was killed by the Wisconsin legislature April 14, by a vote of 62 to 26.

Arguments against the measure were that the cement business is too specialized and that the state does not have the proper raw materials for the business.

## Cement Price War on in East and Mid-west

### QUOTATIONS AT $1 AND LOWER

In the scramble for the limited business placed in the past several months contracts have been closed by cement manufacturers at prices that show no profit to the manufacturer. In a number of instances involving large tonnages for road building and public works, states and municipalities, taking advantage of the demoralized market, have called for and rejected bids on the same projects several times, and have obtained lower prices on each new proposal. As a result, the entire producing territory east of the Rocky Mountains is involved in a chaotic price war.

Companies are getting an average of around $1 a barrel net in bulk at the mills, as compared with about $1.65 a year ago. The present price is considerably below the cost of production of the great majority of the mills of the country.

The current quotation in New York for cement packed in paper containers and less all discounts, is $1.69 a barrel. As of January 1, last, the price was $1.94. In Chicago the quotation has declined to $1.40, from $1.86.

Substantial contracts are said to be bringing considerably less than $1 per barrel in numerous instances, and in one case a price of 57 cents has been reported.

The present chaotic state is a result of competitive conditions during the past two years. With productive capacity greatly overbuilt and with demand declining due to the let-up in building operations, many of the smaller mills, in an endeavor to keep up their output and thereby keep down their operating costs, have been shading the price of the larger producers and getting more than their pro rata share of the business available. In addition, in many instances, they have gone after business outside their natural sales territory by undercutting prices in markets already well supplied by local concerns.

Present capacity is considered by the cement trade as far in excess of the probable requirements of the country for some years to come, even under favorable business conditions. This condition was ably pointed out in an

(Continued on page 31)

## E. D. Boyer Retires from Cement Industry

### HAD LONG SERVICE RECORD

A cement industry career which began before the first concrete pavement in America was laid has just come to its formal close with the retirement of Edward D. Boyer as technical service manager of the New York office of the Universal Atlas Cement Co., a subsidiary of the United States Steel Corporation.

Mr. Boyer is a director and former president of the American Concrete Institute and a past director of the American Society for Testing Materials, and has been for many years a member of the Portland Cement Assn. technical-problems committee. In his business lifetime he has seen American cement shipments grow from a few thousand barrels a year in the eighties to 160 million today, with producing capacity for 100 million more. He came to New York in 1914 as technical department manager of the Atlas Portland Cement Co., having joined the company in 1902 as assistant to the general superintendent of the Northampton, Pa., plant, its largest establishment. E. K. Borchard, technical service engineer, also of New York, who joined the Atlas organization in 1917, took Mr. Boyer's place.

Only a few straggling American cement mills were daring to compete with the product imported from Europe, and modern large-scale production from huge rotary kilns for low-price construction markets was undreamed of, back in 1888, the year of Mr. Boyer's entry into the cement business as superintendent of a mill at Cementon, Pa. A native of Catasauqua, Pa., in the now famous cement-producing Lehigh valley, he had specialized in chemistry at Muhlenberg College, Allentown, and had graduated from the Philadelphia College of Pharmacy as president of the 1877 class of more than 400 members. The cement field had attracted his attention at an early age through the establishment of the first American plant at Coplay, a few miles above his home and college communities, by David O. Saylor in 1872. The first American concrete pavement was to be laid 20 years later at Bellefontaine, Ohio, where it is still in service; and by 1897 American cement mills achieved a production exceeding European imports.

Displacement of the old dump kilns by the new rotary kilns, which are long cylinders often large enough to drive an automobile through, forced the company employing Mr. Boyer to dissolve, and sent him instead to Elizabeth, Pa., in 1900, to build a rotary kiln plant. It was never operated, however, because the patented process of manufacture proved unsuccessful. He then joined the Atlas organization, which was to become a United States Steel Corp. subsidiary years later through its union with the Universal company in 1930.

Edward D. Boyer.

His successor, Mr. Borchard, represented the shipping board during construction of the concrete ship *Faith* at San Francisco in 1918, and also aided in building other concrete ships and barges. From 1911 to 1916, with headquarters in Philadelphia, he directed promotional work for the Association of American Portland Cement Manufacturers, now the Portland Cement Association.

## Peck-Thompson Leases Kansas City River Site

The Peck-Thompson Sand & Material Co., Railway Exchange Bldg., Kansas City, Mo., of which Frank W. Peck is president, has leased 23 acres of land at Kansas avenue and the Kaw River, in Kansas City, Kan., on which will be erected dredging and materials-handling machinery costing about $40,000, to dredge sand and gravel from the Kaw River.

## Georgia Producer Gets Government Gravel Job

Having recently obtained a contract for 3,500 cu. yd. of sand and gravel from the government for paving work at Fort Benning, Ga., the Wardlaw Sand & Gravel Co. of Columbus, Ga., is preparing to increase its capacity. The Wardlaw company operates along Bull Creek, three miles south of Columbus, employing two 6-in. pumps and a power drag-scraper. The latter is being reinstalled to take advantage of a recently opened deposit of excellent Georgia gravel.

The Wardlaw company prides itself in its service to its customers made possible through the use of outside-owned-and-operated trucks. The owner-drivers of these trucks, it is claimed, render a quicker and more reliable service when working for themselves.

## Soviet Cement-Plant Contract Cancelled

### SPURNS U. S. BUILDER'S IDEAS

Contracts for the construction of the largest cement plant in the world, a giant grain elevator, flour mill and storehouse, let by the soviet government to the McDonald Engineering Co. of Chicago, are being liquidated, the Russians claiming that the American concern did not execute its undertakings satisfactorily.

The Russians purpose to carry on the construction themselves, and have hired several engineers and experts which the McDonald firm sent to Russia about a year ago when the project was started. J. J. Carter of the McDonald company is at Moscow, negotiating for a settlement.

About 25 American engineers were sent to Russia by the Chicago firm, and it was planned to summon 34 more for the cement plant, which was to have been begun at Briansk, near Moscow, last summer, but was delayed. Plans called for an initial capacity of 20,000 barrels per day. The cost of construction was about $30,000,000.

Work was started on the elevator, flour mill and storage plant at Semipalatinsk last year. Transportation broke down, however, and work was held up.

When it was seen that the entire project could not be carried out as scheduled, Mr. Carter concentrated on completing the elevator, rather than continuing all three buildings, with winter coming on and the mercury frequently dropping to 65 deg. below zero. The Russians complained and the contracts were canceled, the soviet organization announcing its intention of proceeding with the work itself, using the plans of the McDonald company. It made tempting offers to several of the McDonald men, and is reported to have offered Mr. Carter a salary of $30,000 per year. Mr. Carter declined the offer, but several of his men accepted.

A section of wall about 45 ft. long on the cement plant being erected near Briansk on plans prepared by the McDonald company collapsed recently and efforts were made by soviet authorities to blame this on the Chicago concern. Mr. Carter, however, pointed out that his plans had undergone considerable alterations and that he had pointed out the danger of attempting to pour concrete in freezing weather, which was largely responsible for the accident.

## St. Louis Salt Producer Buys Plant in Michigan

T. W. Hardy of the Hardy Salt Co., St. Louis, has purchased the plant and properties of the Michigan Tanning & Extract Co., Manistee, Mich., and will manufacture salt and its by-products there.

## Construction Awards Show Seasonal Climb

**MARCH GAIN IS 57 PER CENT.**

A healthy sign in the construction industry is seen by F. W. Dodge Corp. in the expected seasonal but well distributed advance in all the thirteen Dodge territories during March over the preceding month, February. A total of $370,406,300 in contracts awarded in the 37 states east of the Rocky Mountains is reported for March in comparison with $235,405,100 for February. This was divided into $101,337,600 for residential building, $117,346,900 for non-residential, and $151,721,800 for public works and utilities.

Although comparisons with March of last year are less optimistic, they indicate a forward movement in six of the thirteen territories. These were New England with a $38,899,300 monthly total, Upstate New York with a $17,065,300 total, central Northwest with $9,765,500, southern Michigan with $13,317,200, St. Louis with $16,960,300, and New Orleans with $14,496,600. Texas came within $200,000 of matching March of last year.

Results for the first quarter showed gains over the same period of 1930 in the New England, central Northwest, and New Orleans districts. The New England gain was due to public works and utilities. Residential and public works and utilities accounted for the go-ahead in the central Northwest region. For the New Orleans territory the increase was due to gains in non-residential building and public works and utilities while residential building declined.

Metropolitan New York and central Northwest registered quarterly gains over 1930 in residential building. Of the three major construction groups, this type building made the best relative showing for the quarter which ended with March, for it recorded only a 4-per cent loss from the first quarter of last year. The month of January accounted for this entire loss, with February showing a gain, while March practically reached the total for March, 1930, its $101,337,600 nearly matching the $101,491,600 of March last year.

With the lower construction costs now obtainable, floor space is said to reflect new construction volume with perhaps more accuracy than valuation figures. On a floor space basis, residential contracts exceeded the corresponding quarter of 1930 by more than 2 per cent.

## Cement Price War Rages

(*Continued from page 29*)

article in the Mar. 25, 1931 issue of PIT AND QUARRY, entitled "Production Capacity of Cement Plants Ample for Years to Come," by Blaine S. Smith, president of Pennsylvania-Dixie Cement Corp.

Since the first of the year, price weakness has been aggravated by a sharp contraction in demand, with the result that the larger and lower cost producers have been impelled to seek business regardless of price to keep their mills operating and maintain their position in the industry.

The price war had its origin in the Middle West, where competition is even more severe than in the rest of the country and where current prices are about 50 cents a barrel lower than in the East.

While it is possible that the various producers will compose their differences within the not distant future by prorating output, some interests in the industry believe that a prolonged period of extremely low prices is likely. A somewhat similar situation developed in 1912 and continued into 1915.

## Two Sand Producers in Florida Complete Merger

The Interlachen Sand Co., Interlachen, Fla., and the Diamond Sand Co., Lake Wales, Fla., have recently merged, forming the Diamond-Interlachen Sand Co. The main office will be in Jacksonville, Fla. For the present, shipments of sand will be entirely from the Interlachen plant. Officers of the new company include S. D. Gooch, president; J. D. Baker, Sr., vice-president; and J. S. Baker, secretary-treasurer. L. D. Smith is superintendent at the Interlachen plant.

## Favors Sale of Michigan Cement Plant at Chelsea

Sale of the state-owned cement plant at Chelsea, Mich., has been recommended by the ways and means committee of the Michigan state legislature, provided a "proper sales price" is obtained.

The committee reported favorably on the measure after it had been amended, the original bill calling for the outright closing and sale of the plant.

The plant has lost money during the entire time it has been operated by the state, despite the fact that much prison labor was employed, it is declared.

## Earthen Shoulder on Power Dam Gives Way

**PRODUCER'S OPERATIONS STOP**

Breaking through a weakened earth abutment of the Thompson-Weinman Co. power dam near Cartersville, Ga., the Etowah river with characteristic swiftness tore its way free. The break occurred early in the morning of April 2, and the rushing water quickly carved a detour 100 ft. in width around the eastern end of the concrete dam. Without the necessary head of water to turn the turbines in the power house, the mill and mine operations of the Thompson-Weinman Co. were paralyzed as they depend entirely upon the hydraulically-generated power from this stream.

The dam is a reinforced-concrete structure 450 ft. in length and normally carries a 10-ft. head of water. The power house, containing three vertical direct-connected turbine-generator units developing 600 hp., is located on the western end.

With nearly 200 men working day and night, it required four days to repair the break. Over 60,000 bags rushed to the scene from the Fulton Bag & Cotton Mills of Atlanta, Ga., were filled with sand and massed together across the 100-ft. gap. Twenty-five trucks in a continual procession brought rocks and boulders from the mine to back up the sand-bag wall, thus forming a formidable though temporary bulwark. A new wing will be added later to replace the temporary repair work. It will be of reinforced concrete.

According to H. W. Smith, secretary-treasurer, the break caused no delay in shipments of the company's products, which include barytes, chats, and marble products. Repairs to the dam will entail a cost approaching $10,000, it is estimated.

## Salt Dome in Louisiana Leased by du Pont Firm

The All States Production Co., a subsidiary of E. I. duPont de Nemours Co., is reported to have leased a salt dome about six miles from Thibodaux, La., and will develop the property for sulphur and other minerals.

**Workmen repairing washed-out abutment of dam in Georgia.**

## Wellston to Dedicate Safety Award May 27

### NO ACCIDENTS IN 18 MONTHS

The Wellston Iron Furnace Co. of Jackson, O., operates a cement plant at Superior, O., in which Superior Portland cement, WIFCO super mortar, and colored cements are manufactured. Formerly many accidents occurred in the mine and the mill.

Early in 1927 a safety program was inaugurated and, two and one-half years later, regular safety meetings were instituted. At these meetings there have always been serious discussions as well as entertainment features and refreshments. The employees have become imbued with the safety idea to such an extent that operations have continued for 534 consecutive days without a lost-time accident.

At this plant the limestone is excavated from a 7-ft. bed by underground methods. Accidents occurred often, prior to the safety campaign, but the mine is now one of the safest departments of the company.

The company employs about 160 men, all of whom are deeply interested in the celebration which is being planned for May 27, 1931, when a Portland Cement Assn. safety trophy is to be unveiled and dedicated at the plant. This trophy has been erected in a prominent location.

Victor Deifenderfer, superintendent, is chairman of the safety committee, with the fullest coöperation of John A. Blank, general superintendent, as well as all other officials of the company. Much of the remarkable improvements in safety practices has been due to the attention and precaution of Ed. Compliment, mine superintendent, who has not had a serious accident in this or any other mine during his experience covering about thirty years. The company's physician, Dr. Riddle of Jackson, makes weekly visits to the plant to examine the employees and to inspect sanitary conditions.

The company's safety committee is shown in the group picture below.

## Fire Causes $2,500 Loss at Molding-Sand Plant

The molding-sand plant of Eugene W. Smith, Inc., about 20 miles from Evansville, Ind., was damaged by fire recently, when the laboratory was struck by lightning. The laboratory and warehouse were destroyed. The damage to buildings and machinery amounted to about $2,500. The plant, which had a capacity of 4 cars a day, will be rebuilt.

## Material Service Corp. Will Lay Spur Trackage

Spur tracks to connect the Paul Ales plant of Material Service Corp. at Lockport, Ill., with the E. J. & E. railroad are to be constructed soon, it is reported. At present the Ales plant is limited to shipping by water and trucks, much of its sand and gravel going to Chicago by barges leased from the Leathem Smith-Putnam Navigation Co.

## Work Resumed at Medusa Plant at Baybridge, Ohio

Ending a lay-off of several months, 150 men returned to work April 16 at the Medusa Cement Co. plant at Baybridge, near Sandusky, O. Officials report the company expects an extended period of operation.

## Producers in Louisiana to Sell Coöperatively

Sand-and-gravel producers in eastern Louisiana have formed the Material Service & Development Co., through which all sales are to be made coöperatively. Eleven plants are represented.

*Standing, left to right:* James Waugh, machine shop; Howard Eaches, repairs; George Newhart, recreation hall; Earl Canon, chief electrician; Charles Zellner, burner; Harry Gustin, kiln repairman; John Warix, burner; Vinton Gustin, sacker; Charles Whitlatch, packer; George Tibbs, raw mill; Ed. Stumbo, construction foreman; John Dalton, foreman; Lon Rowe, electrician; George Markins, master mechanic. *Seated, left to right:* Bob Callahan, supt. mortar dept.; Fred Bescoe, chief chemist; Delta Hutchinson, mill foreman; Victor Deifenderfer, mill supt.; John A. Blank, general supt.; Ed. Compliment, mine supt.; Ed. Fry, mill foreman; Alva Munyon, mine foreman.

## Road Builders Gather at Washington May 15

### TO OUTLINE YEAR'S PROGRAM

The annual meeting of the American Road Builders' Assn. will be held in Washington, D. C., on May 15. Other meetings of old and incoming boards of directors of the national association and the various divisions will be held on May 14 and 16.

Plans will be perfected at these meetings for the work of the coming year. Among the subjects to be discussed are the appointment of joint coöperating committees with the American Association of State Highway Officials and the Highway Research Board, and the chairmen of more than a score of committees that will engage in the investigative work of the year.

Results of committee work during the past year will be reviewed and new subjects for committee work examined and approved. Members have submitted a number of new subjects for investigation.

Meetings will be held of the old and incoming boards of directors of the County and City Divisions. The various executive committees will also meet and plan their work.

The Presidents' dinner on May 15 will be a gala affair. This annual event has always attracted a full attendance of officials of the association. This year special preparations are being made to pay increased honor to W. A. Van Duzer, the retiring president, and to make the event unusual and interesting.

Officers for the coming year are:

President—W. R. Smith, Lane Construction Co., Meriden, Conn.; Vice-Presidents—Samuel Eckles, chief engineer, Pennsylvania department of highways, Harrisburg, Pa.; H. G. Shirley, state highway commissioner, Richmond, Va.; S. F. Beatty, president, the Austin-Western Road Machinery Co , Chicago, Ill.; Stanley Abel, board of supervisors, Kern county, Cal.; Treasurer—J. H. MacDonald, consulting road and paving expert, New Haven, Conn.; Directors—H. K. Bishop, chief, division of construction, U. S. Bureau of Public Roads, Washington, D. C.; R. B. Brooks, director of streets and sewers, St. Louis, Mo.; P. L. Griffiths, vice-president, American Tar Products Co., Pittsburgh, Pa ; A. L. Grover, secretary, New Jersey highway department, Trenton, N. J.; Richard Hopkins, contractor, Troy, N. Y.; J. E. Pennybacker, managing director, the Asphalt Institute, New York, N. Y.; H. C. Whitehurst, engineer of highways, District of Columbia, Washington, D. C.

The Albany Sand & Gravel Co. of Albany, Ore., recently added a gasoline-operated crawler shovel at its plant.

## Places Container-Car Service in Operation

### NEW TYPE FOR PACKAGE GOODS

Container-car shipping service, differing from the bulk-freight container type described in the December 3, 1930, issue of PIT AND QUARRY, has been placed in service between Chicago and Milwaukee by the Chicago & North Western Railway, offering less-than-carload shippers their own individual containers for shipments.

These containers are of 10,000-lb. capacity with inside dimensions of 8 ft. 10 in. in length, 6 ft. 8 in. in width and 7 ft. 1 in. in height and have a side door 6 ft. 3 in. high and 3 ft. 5⅝ in. wide. They rest on the floor of specially built container cars on four legs, one at each corner of the container and in such a manner as to provide absolute safety for the container and the shipment within the container. The empty container weighs about 3,000 lb. It has a capacity of 417 cu. ft.

While some of the products of interest to readers of PIT AND QUARRY, such as lime, cement and gypsum, will not be handled in bulk in this type of container, all such products can be handled if sacked, and all other products will be handled if they are adaptable to container usage.

There will be no rehandling on these l. c. l. shipments at freight stations.

The North Western is offering these four types of container service:

*Door to door*—The railway company delivers the empty container to the shipper's place of business, picks it up when loaded, delivers the loaded container to the consignee, and returns the empty container.

*Station to station*—The shipper may, if he elects—at a saving in rate—call for the container at the railway station indicated and return the same loaded; and, at the destination, the consignee may take the container from the station to his place of business and return the empty container; or the shipper may bring his goods to the railway platform and load them in the container and the consignee may unload the container at the inbound platform and take the shipment to his place of business.

*Pickup only by the railway company*—The railway will deliver the empty container to the shipper and will pick-up the loaded container, and consignee will perform his own delivery service at the other end either by unloading the container at the freight station or by taking it to his place of business for unloading, returning the empty container to the freight station.

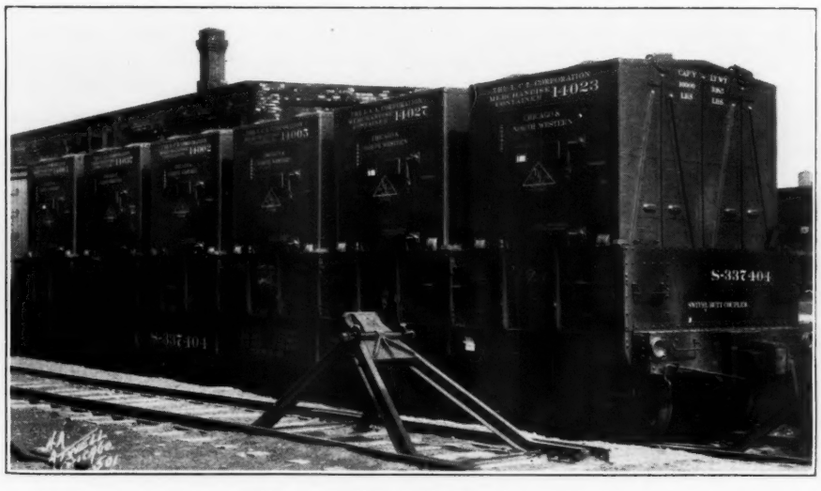
*Delivery only by the railway company*—The shipper may unload his goods into the container at the railway station or may pick up the empty container at the outbound platform and return it loaded to the platform. The railway will deliver the loaded container to the consignee and pick up the empty container.

This new system has several advantages over the old, chief of which are the elimination of packing and classification requirements, reduction in shipping costs, no intermediate handling of goods, provision of bill of lading from store-door to store-door, insurance of prompt service, flexible service for the l. c. l. shipper, reduction of the possibility of damage, protection from inclement weather, elimination of the possibility of pilferage, and the practicability from the standpoint of modern transportation requirements.

The sides of the container car are composed of sections which correspond with the containers as to number and size. Each section is hinged to the floor and swings outward and downward filling in the space between the car and the loading and unloading platform acting as a gang-plank over which the container may be moved from the car to the platform or vice-versa. The containers are loaded and unloaded from the car by means of a lift truck furnished by the railway.

## To Construct 3,000-Ton Silica-Sand Operation

The Silica Products Co., of Harrison, Ark., will build a new silica-sand plant at Everton, about 15 miles from Harrison, where sand properties were recently acquired, according to D. D. Dunkin, president. The plant will have an initial capacity of 3,000 tons a day, and will cost over $70,000 with loading, conveying and other equipment. The company now operates a silica-sand plant at Guion, Ark.




Container car showing side doors in containers.

## Gravel Assn. Handles Ready-Mixed Affairs

### BURKE EXPLAINS ARRANGEMENT

J. E. Burke, president, announces that the board of directors of the National Ready Mixed Concrete Assn. has concluded arrangements with the National Sand and Gravel Assn. whereby the executive personnel of that organization will conduct the activities of the National Ready Mixed Concrete Assn., in addition to those of the sand and gravel industry. Although the executive personnel of the two associations will be the same, the activities of the organization will be handled independently of each other.

The headquarters of the concrete organization were transferred, April 1, to the Munsey Building, Washington, D. C. Stanton Walker will act as director of engineering, and V. P. Ahearn will handle the duties of the executive secretary.

While the National Ready Mixed Concrete Assn. has been in existence for less than a year, it includes within its membership a substantial number of ready-mixed concrete companies, representing every part of the United States and Canada. The officers feel that considerable progress has been made in coördinating the interests of the ready-mixed concrete industry, and they are confident that the accomplishments of the organization in the future will merit the support of all branches of the industry. Within a short time, association publications will be available dealing with the manufacture and use of ready-mixed concrete. Requests for these publications should be submitted to the Washington headquarters.

## Cement Barge Makes Its Initial Trip of Season

The self-unloading cement barge of the Universal Atlas Cement Co. on Tuesday, April 15, made its first trip of the season. A load of approximately 9,500 bbl. of cement was carried from the company's plant at Buffington, Ind., to the storage and packing plant on the Menominee River, Milwaukee, Wis.

## Houston Firm Develops New Salt-Mine Project

The Houston Salt Co. is reported to be developing a salt mine on deposits which it has under lease of approximately 1,000 acres at Hockley, Tex. The company has constructed a shaft for a maximum capacity of 350 tons of salt daily while a permanent unit is to be designed to treat 100 tons salt an hour. The cost of the main plant will be $300,000.

The California Stone Co. has opened an office at 4153 Broadway, Oakland, Cal.

# Editorials

## *Business at Any Price*

FROM the Lehigh district of Pennsylvania comes the report of a 500,000-barrel contract for cement, accepted by one of the local cement companies at a price of 57 cents a barrel. If authentic, this sets a new low figure for this highly competitive area and establishes a new goal at which prospective cement buyers will aim. It marks what we hope is the low-point of a merciless price-cutting campaign brought about by a degree of overexpansion and overproduction that is probably unparalleled in American industry.

Doubtless the customary explanations will be forthcoming. Business is "bad," and this 500,000-barrel contract just rounded out a full year's production. Or, the low price was made in the expectation that it would be justified by increased production and the division of the overhead over a greater product. Or, a desire to maintain existing organization intact and to avoid further unemployment indicated the desirability of cutting the price to a point below the actual cost of production. Unfortunately, such explanations will not carry conviction among those who recall similar, although not such drastic, reductions in the past, when lack of business, low production and unemployment did not exist in like degree.

Buyers are not slow to take advantage of the weakness which this policy of price-cutting, followed on a national scale, discloses. Highway departments, realizing the competitive situation between neighboring cement producers and the new rivalry that has developed between concerns which, in better times, were not considered competitors but which, under present conditions, have overstepped their customary market lines, have refused to accept bids which they did not believe represented the lowest prices they could get. Contractors are equally sharp in capitalizing on the extremity of the cement industry, which finds itself in the absurd position of trying to stem the tide of declining business with the frail policy of profitless prices. Concerted action by large buyers can easily destroy in this manner the price structure of an entire industry.

The consumer is not interested in the problem of cement profits, except in so far as he always believes them to be too great and is always ready to applaud government action for the repression of industrial profit-taking. He demands low prices even at the sacrifice of production profit, and shows no concern whatever for the stability of the industries from which he buys. At cement prices commonly quoted, the consumer stands to gain some fifty million dollars this year. What concern is it of his that he does so at the expense of cement-company stockholders, who, in his opinion, fatten on the profits of cement sold at prices averaging around 80 cents a barrel! It requires a foresight far beyond the intelligence of the average consumer to realize that profitless business on the part of the cement industry or any other large commercial group soon communicates its effects to other industries and, so, ultimately to the consumer himself. The industrial strength of the nation is no greater than the combined strength of all its industries, and these can not suffer, either individually or in groups, without their weakness impairing the strength of the whole fabric and without public confidence in all business being destroyed.

The producer who sells his product without realizing a profit is not as shrewd as he thinks himself. He may achieve what appears to be a gain, but it is only momentary. He may take business away from his competitor, but this does not give him any lasting advantage over that competitor. He may fill a large gap in his production schedule, but this does not place his business on a permanently sound foundation. When business rivals indulge in competitive price-cutting on the scale shown by the cement industry, the so-called "successful" bidder is, in reality, not successful at all, and those who "lose" in the competitive race to quote the lowest price really gain. Of all the bidders who foolishly quote below the profit-line, the most foolish bidder is he whose price is the lowest. He has gone farthest to demonstrate his incapacity for conducting his business on a sound basis; he has made the greatest concession to the unreasonable demands of the buyer; and he has done most to inflict a permanent damage on his industry.

Much of the present wave of price-cutting is the result of hysteria. One must be dull indeed not to recognize the fact that it is not the product of close reasoning. The man who sells below cost is panic-stricken; his actions are not to be judged by the standards set by thinking men. Like the clerk who, fearing to be found idle, shuffles and rattles his papers and loudly opens and closes the drawers of his desk, the price-cutting and profit-destroying producer wastes his energy and capital doing useless work, and all because he seems to be afraid to be caught unemployed. In the presence of an emergency his sanity forsakes him; he exhibits all the symptoms of abnormal psychology, and performs acts which, to the sane mind, uncover his chaotic mental condition and which, in his lucid moments, he would himself be the first to condemn.

The executive who allows himself to be stampeded into a war of price-cutting lays his competence open to suspicion, while the directors who

retain him and acquiesce in his profit-destroying policies assume, toward their stockholders, a grave responsibility which they are not likely to discharge. The motive of business is profit; not irregular, intermittent and uncertain profit, but consistent, steady and dependable profit. Business obtained by the waiving of such a profit does not meet the requirements of sound commercial enterprise. It is business governed by expediency. It is business at any price and, hence, not business at all.

## *Building Ill-Will*

REFERRING to a recent newspaper report of an alleged saving of $3,000 accomplished, through the use of water rather than rail transport, by a cement manufacturer, a curious reader wrote the paper's editor to inquire whether the retail price of the cement shipped had been commensurately reduced. His query indicated very clearly that he not only doubted that it had been so reduced but that he also believed that it should have been reduced, the consumer being entitled, in his opinion, to the benefits of all the economies effected by the producer.

This view of economic justice may provoke a smile on the part of the manufacturer, but it is typical of the "economic thinking"—if we may so dignify the process—of large sections of the population. It represents a very general feeling on the part of consumers, an attitude that often finds support in newspaper accounts of the large profits supposed to be made by producers in all lines of business. It is given much encouragement, as far as the cement industry is concerned, by the appeals to prejudice made by politicians and others having similar aims, who never tire of talking of the enormous profits in cement making, and who never feel bound, by a sense either of fairness or of shame, to point out the below-cost prices at which much cement is sold. It feeds, too, for example, on the exclusion of the public and the trade press from the cement industry's meetings, a fact which, while explicable to the satisfaction of the industry, is mysterious and carries sinister implications to the populace.

The cement industry needs all the good-will it can acquire, and publicity of the right kind could be a very useful tool. Obviously, opinions of the kind mentioned are more damaging than helpful, especially when not counter-balanced by defensive propaganda.

## *The Outlook Brightens*

ACCORDING to the best information obtainable, the non-metallic mineral industries did not fare as badly in 1930 as has been generally asserted. Reliable data show that the mineral industries, including metallic and non-metallic, declined approximately 18 per cent. last year as compared with 1929. The metallic branch of the industry fell 33 per cent., while the non-metallic branch declined only about 15 per cent. The last group includes, however, coal, petroleum, gasoline, and natural gas, in which the losses were greater than the average loss for the group, so that the decline in stone, sand and gravel, cement, gypsum, lime and miscellaneous non-metallic minerals was probably not greater than 12 per cent. and may have been as little as 10 per cent.

Although a decline as small as 10 per cent., even when it results from comparison with an abnormal year such as 1929, is enough to bring discouragement to the average non-metallic-mineral producer, it is not nearly as great as that experienced in many other industries. A recent survey of the financial reports of 886 companies in 31 different lines of business, none of which included the production of non-metallic minerals, showed that the average decline in profits in 1930, as compared with 1929, was 39.67 per cent. and, as compared with the more nearly normal year of 1928, 28.68 per cent. Thirty-three mining and smelting companies showed an average decline of 65.29 per cent. compared with 1929; 63 building-material and equipment concerns 31.95 per cent.; 37 oil-producing and refining concerns 32.05 per cent.—to name a few related industries. Profits in the automobile business, as shown by the reports of 15 companies, declined 50.07 per cent. and in the business of making automobile parts (42 companies) 66.22 per cent.; in machinery and tools (65 concerns) 50.38 per cent.; and in paper products (32 concerns) 49.13 per cent. Clothing profits declined an average of 67.24 per cent. for 37 concerns, those in meat-packing (18 concerns) 16.61 per cent. and those in miscellaneous foods (23 concerns) 17.64 per cent. With the profits in such necessities declining faster than 15 per cent. producers of non-metallic minerals may congratulate themselves that their business has declined no more than 10 or 12 per cent.

In view of these facts, which are sufficiently representative to indicate average conditions, producers should feel more confident of the outcome of business this year, especially as steadily increasing car-loadings show a sustained and growing demand for construction materials. Reports of the first quarter's business are beginning to come in from producers in widely scattered sections of the country, and, while there are isolated cases of decline, the general tendency is upward. Making proper allowances for the usual seasonal increases, the gains are significant and far enough in advance of the normal spring rise to give encouragement. The industry has patiently looked forward to just such a steady increase, very properly fearing a rapid rise and the sharp decline that would inevitably follow, and now that this increase has continued for more than three months there is every reason to believe that it will be maintained throughout the summer. With such an outlook, producers are justified in making some of the many needed improvements which have been postponed awaiting the return of "good" business.

A view from the plant toward the pit showing the system of field conveyors used. The type of deposit is clearly illustrated.

# Records of Operating Costs Induce This Producer to Erect New Plant

## Diesel Generating Unit Supplies Power; Shipments Are Made by Motor Truck Only

By W. E. TRAUFFER

FOR a number of years the Highland Sand & Gravel Co. operated a sand-and-gravel plant at West Roxbury, Mass., a suburb of Boston. This plant, built in 1921, was considered an efficient operation. It had a capacity of 100 tons per hour and operated continuously until October, 1929.

Looking toward the plant with one of the field conveyors in the foreground. Auxiliary hopper and feed conveyor at right.

Careful records of operating costs were kept during this period. A study of these costs, combined with the fact that the deposit was becoming exhausted, resulted in the decision to build a new plant at another location. The old plant is now used only in an emergency or when the demand exceeds the capacity of the new plant.

The new plant, which went into operation in April, 1929, is located at Newton, a suburb seven miles southwest of downtown Boston and only a few miles from the plant at West Roxbury. This plant incorporates all the best features of the old plant as well as a number of new ones considered desirable through experience with the other plant. It has a capacity of 200 tons per hour and makes shipment only by truck.

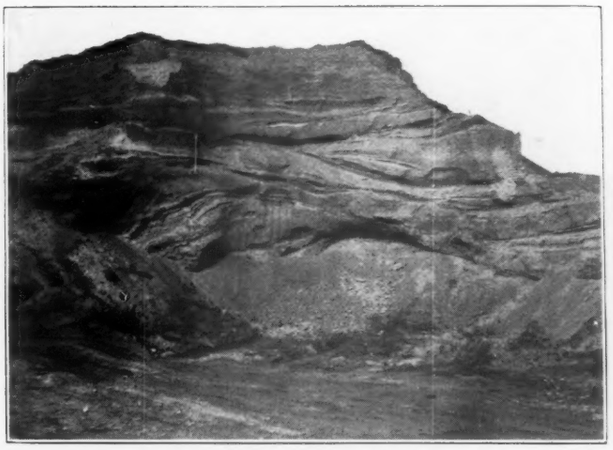
The unusual deposit made the use of trucks advisable for pit haulage, and field conveyors were decided upon to carry the material to the plant. All buildings and conveyors were so constructed that they can be readily taken down and re-erected at another location should this become necessary. Only the best of equipment was used throughout.

Perhaps the most interesting feature of the plant is the Diesel generating unit which supplies power for all plant operations. This unit effects a saving of 30 per cent over purchased power and has proved more dependable. Only eight men are required to carry on operations at this plant, including stripping. The old plant, with about one-half the capacity, required thirteen men for full operation. This comparison illustrates clearly the savings that can be effected by applying the results of a complete cost record and practical experience to the design and construction of a plant.

The trucks are backed onto an earthen ramp from which they dump over an 8-in. rail grizzly into a timber hopper. Any oversize gravel is sledged through this grizzly by the hopper attendant. A Link-Belt 30-in. reciprocating feeder discharges the material to field conveyor No. 1. This conveyor is 24 in. wide and operates on 200-ft. centers. It is horizontal for most of its length and then is inclined to its end where it discharges into a small steel-lined timber hopper. This feeds onto conveyor No. 2 which is 24 in. wide, on 350-ft. centers and is inclined, at its discharge end, to feed to a second wooden hopper. Conveyor No. 2 was originally the field conveyor, conveyor No. 1 being added when the material near the plant was exhausted and the pit required extension.

Conveyor No. 1 is Texrope-and-gear driven by a 15-hp. motor, and conveyor No. 2 by a 15-hp. motor through a Falk herringbone speed reducer. Both these conveyors have portable steel-truss sectional frames which are rigid enough to keep the conveyor in perfect alignment and light enough to be easily carried by a few men when the conveyor needs to be shifted to another part of the pit. These conveyors were furnished complete by the Barber-Greene Co.

A Lorain 75 gasoline drag-line with a Page 1-cu. yd. bucket excavates the underwater material while



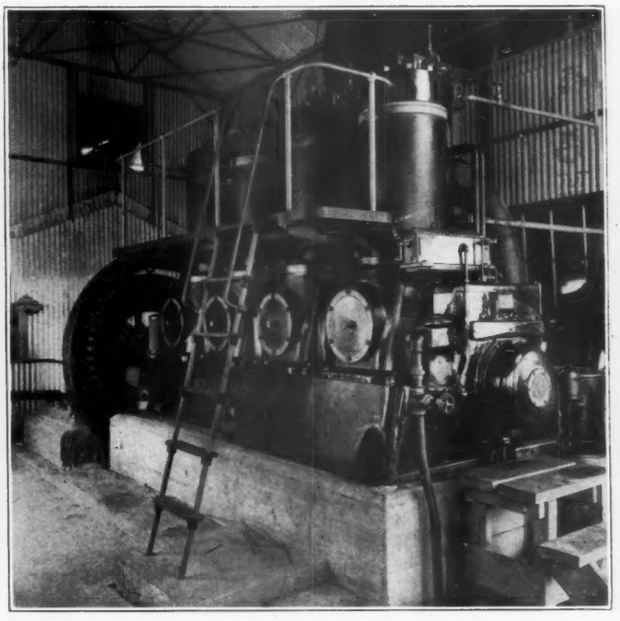
An unusual stratified sand-and-gravel bank formation in the pit.

a Lorain 75 gasoline shovel with a 1¼-cu. yd. dipper excavates from the bank. Both load to Sterling 5-ton pneumatic-tired trucks. These are equipped with Heil hydraulic hoists for quick dumping.

Another truck hopper has been installed near the end of conveyor No. 2. This is used for producing plaster sand from a deposit directly in front of the hopper, and for handling materials that are returned from the bins to be re-crushed and screened. This hopper also has a rail grizzly and a Link-Belt reciprocating feeder. A 24-in. inclined conveyor on 75-ft. centers feeds from this hopper into the same hopper as conveyor No. 2. This conveyor is known as No. 3 and is belt-driven by a 10-hp. motor.

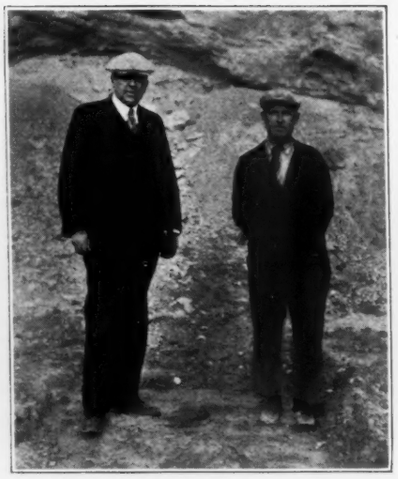
Another Link-Belt reciprocating feeder discharges the material from this hopper onto inclined conveyor No. 4 to the screening plant. This conveyor is 24 in. wide, on 260-ft. centers and has an inclination of 18 deg. It is driven by a General Electric 25-hp. motor through a Falk speed reducer and has a Link-Belt automatic band brake which prevents reversing under load in case of power fail-

One of the gyratory crushers discharging to the return conveyor.



The 240-hp. Diesel engine which supplies power to plant.

Drag-line loading gravel from underwater deposit to truck.



A. C. West, treasurer and gen. supt., left; Thos. McCormick, foreman, right.

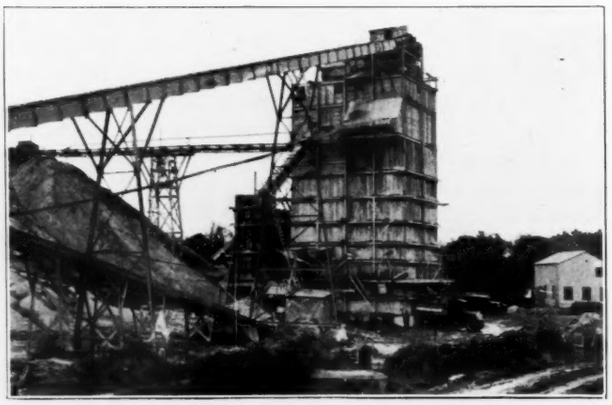
Shovel loading truck in gravel pit. Truck hauls to field conveyor.

ure. This conveyor is supported on a steel framework comprising two side girders of light construction. The internal bracing in this bridge forms the deck on which the conveyor is carried and the walkway. This type of construction keeps the conveyor idlers in perfect alignment and requires only three supporting structural-steel bents which are mounted on concrete footings. This unit was designed and fabricated by the Underwood Machinery Co., Boston, Mass. Link-Belt Timken-bearing conveyor idlers are used.

Conveyor No. 4 discharges at the top of the plant to a Traylor 48-in. by 12-ft. rotary scrubber which is driven by a 15-hp. motor through a Faucus Mach. Co. worm-gear speed reducer. The scrubber discharges to a Niagara 3-ft. by 8-ft. double-deck vibrating screen. Rol-Man manganese screen cloth is used, 2¼-in. on the top deck and 1¼-in. on the bottom deck. The 1¼-in. to 2¼-in. material retained on the bottom deck goes directly into a bin or to the crushers to be reduced to 1-in. size.

The oversize from the top deck is chuted to a timber surge bin which feeds through sliding gates into two Allis-Chalmers McCully No. 6 gyratory crushers each of which is Texrope-driven by a 50-hp. motor of the same make. The crusher discharges onto inclined belt conveyor No. 5 which feeds the material back onto main conveyor No. 4 to the screening plant. This conveyor is 16 in. wide, on 150-ft. centers, and is driven through a Falk speed reducer and chain by a 5-hp. motor. This conveyor also has Link-Belt idlers and pulleys.

The material (under 1¼-in.) passing through the bottom deck of the scalping screen goes through a split chute to two Niagara 3-ft. by 6-ft. double-deck vibrating screens. Both these screens have Rol-Man $\frac{7}{16}$-in.-mesh manganese screen cloth on their top decks. Two meshes, ⅛-in. and ¼-in., of W. S. Tyler wire cloth are used on the bottom decks. Each screen is belt-driven by a 5-hp. motor. The two larger sizes, $\frac{7}{16}$-in. to 1¼-in. and ¼-in. to $\frac{7}{16}$-in. go directly to bins.



View from pit side showing construction of main conveyor with stock-piling conveyor in background.

Loading sand into truck from bins.

Sand is dewatered by two 4-ft. by 20-ft. sand-drag boxes—one for fine sand, the other for concrete sand. These boxes are driven, through clutches, from a line-shaft which is belt-, chain- and gear-driven by a 15-hp. motor.

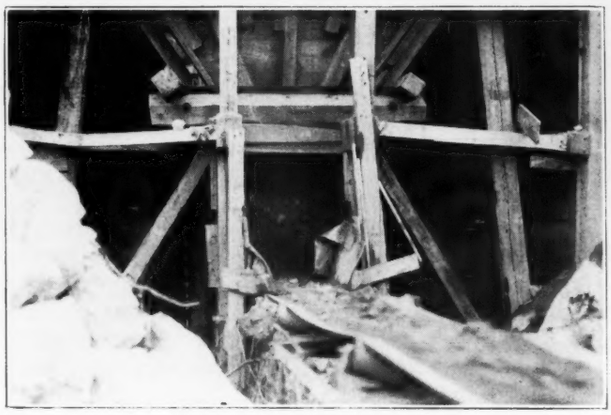
The storage bins are of steel construction with out-side walls of 3-in. planks and partitions of 2-in. planks. This construction proved economical and is exceptionally stable. The top deck is about 75 ft. above the ground. The bin has five compartments

—two for sand and three for stone—with a total capacity of 1,500 tons. These discharge through sliding drop-chute gates into trucks for shipment. The gravel chutes have perforated plates over which the gravel is given a final rinsing as it is loaded. This final rinse, together with the scrubbing and washing over the sizing screens results in an unusually clean product.

There is also a horizontal stock-piling conveyor (No. 6) which can take the sand from the wash boxes and handle it to storage piles from which it is rehandled to trucks for shipment. This conveyor is 24-in. wide, on 125-ft. centers, and is belt-driven by a 10-hp. motor. This conveyor is similar in construction to conveyors No. 1 and 2 and was furnished by the Barber-Greene Co. Most of the motors and electrical equipment were furnished by Fairbanks, Morse & Co. and the conveyor belting was furnished by Boston Woven Hose & Rubber Co.

Truck discharging load of gravel from pit into field conveyor hopper.

Stock-piled material is rehandled directly into trucks by a Barber-Greene Type 42-A bucket loader. A Lorain 60 gasoline crane with a Williams 1-cu. yd. clamshell bucket also rehandles from stock-piles into two Blaw-Knox 125-ton-capacity circular steel hoppers. These are used for truck loading, one for fine sand, the other for coarse sand. They discharge into trucks through sliding gates which are operated by chains from the ground by the truck driver. A small yard office at the entrance to the company's property houses a Fairbanks 25-ton-capacity truck scale on which all shipments are weighed.

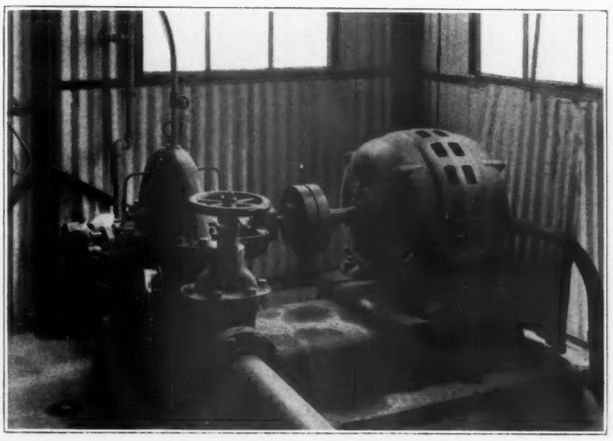


Reciprocating feeder discharging from field hopper to one of the field conveyors.

Truck being loaded with sand from one of the steel loading bins.

As has been stated, the company generates its own power. The power-house is a neat steel-frame structure with corrugated-metal siding and concrete foundations. A Fairbanks, Morse & Co. 4-cyl. 240-hp. full-Diesel engine drives a 155-kw. generator of the same make which furnishes 220-volt current for all plant motors. A 10-kw. generator driven from the same shaft is used for excitation of the large generator. Two Midwest air filters on the air intake insure long life to all the internal working parts of the engine. The engine is cooled with water pumped from three driven wells.

A Fairbanks-Morse 3¾-in. by 3⅜-in. single-cylinder air compressor, driven by a gasoline engine, furnishes air for starting the Diesel engine. This air is stored in two receiver tanks designed to carry 245-lb. pressure. The same building houses a Fairbanks-Morse centrifugal pump, with a 10-in. intake and an 8-in. discharge, for furnishing wash-water to the plant. This is supplied from a pond near the building and delivers water to the plant at the rate of 1,000 gal. per min. against an 85-ft. head. The pump is driven by a 50-hp. electric motor. Crane valves and fittings are used on all water lines.



The 6-in. centrifugal pump which furnishes wash water for the plant.

(Continued on page 57)

# The Care and Upkeep of Drill Steel at a Granite Quarry in Vermont

## New Automatic Equipment in Shop Puts Manufacture on Mass-Production Basis

*One of the really important cost factors in quarrying operations is the upkeep of the drilling equipment. This includes both the drilling machines themselves and the drill steels. The expense involved in re-sharpening bits is always recognized. Usually, however, little attention is given to a number of related phases of rock drilling that are discussed in the accompanying article, prepared by the engineering staff of a large company which has devoted an unusual amount of effort and expense in systematic investigations that were intended to develop information of practical value concerning the manufacture, care and maintenance of drill steel.—Editor.*

IN many commercial arts great strides have been made during the past decade to minimize the personal equation by mechanical means. The advance in this direction has been extended to embrace the art of rock drilling, including both the drilling machine and its drill steel.

For many years the Wetmore & Morse Granite Co., Barre, Vt., had realized that, while a drill bit may, by the use of modern drill-sharpening machines, be formed perfect in design considering the work for which it is intended, it was not the best drill bit for that work unless it resisted to a maximum the tendency of the work to destroy it. As a result of this investigation, the following knowledge of the proper heat treatment consistent with the adopted drill-steel material and drill bits that are correctly forged, shaped and gauged for the requirements of the work in hand, was developed.

For the forging and heat treatment of jackhammer steels:

(a) The drill bit should be forged at a temperature not exceeding 1,975 deg. F.

(b) Heating for forging should be accomplished under conditions that positively prevent the bit from scaling with resultant decarburization, and with fuel conditions that insure a neutral heat at all times. Should an excess of sulphur be present in the fuel, the effect is equally as disastrous as decarburization.

(c) Provision should be made to insure the drill bit being heated in a reducing atmosphere to the required forging temperature thoroughly and evenly to the core before it is removed from the furnace. If the bit is heated in a fast, hot fire, the temperature of the outer surface is raised to that required for forging before the core is heated sufficiently. If hollow drill steel be punched in this condition, the tendency will be to start cracks which, when the material is hardened, invariably result in breakage.

(d) After being forged to the required shape, the steels should be allowed to cool slowly in the open air before they are reheated for hardening and tempering.

(e) To properly harden and temper the bit, it should be heated, in a reducing atmosphere, to the upper critical range temperature of the steel, thoroughly and evenly to the core, for a distance back sufficient to overlap the forging heat. It should then be quickly quenched in cold running water with its cutting and reaming qualities fully submerged and held under these conditions until the temperature of the cutting edge is cooled to 150 deg. F., after which it should be transferred to cold still water and gradually submerged during a period of 15 to 30 seconds (depending upon the size of the bit) until it reaches a depth corresponding to the length of the forging heat.

For forging broaching bits, the essentials were found to be the same as for drill bits on channeler and jackhammer drill steels, but a slightly different hardening treatment was found necessary. This consists of heating the bit end of the steel to a temperature corresponding to that of the upper critical range and for a distance back sufficient to overlap the forging heat. When in this condition, the bit should be removed from the furnace and submerged in cold running water to a depth of 3 in. and so held for four to five seconds, after which it should be transferred to cold still water and submerged to a depth of ¾ in. remaining under such conditions until cool.

For the forging and heat treatment of plug-drill steels, the requirements are the same as for jackhammer steels except that a forging temperature of 1,800 deg. F. for a distance back of but 1½ in. is required. The best results are secured when the bit is hardened by heating it to a temperature of 1,350 deg. F. back for a distance of ½ in. and quickly cooling it by plunging in a vat of circulating cold water.

Dies and dollies have not been perfected, so that machine-made bits are superior to hand-made bits because of their greater uniformity.

For heating drill shanks preparatory to forging, it was found essential to adopt the same methods that are employed in heating jackhammer bits. The desired heat treatment is imparted subsequently, thoroughly and evenly to the upper critical range temperature, for a distance of from 1½ in. to 2 in. below the base of the collar or lugs. The heat is then quickly quenched by plunging the steel in a tank containing Houghton's No. 2 soluble quenching oil which is maintained at a uniform temperature by being submerged in an outer tank filled with running water. After being allowed to cool in the oil, the shank should be ground to provide a proper striking surface.

### Minimizing the Human Element

With the foregoing knowledge of the requirements definitely established, it remained for the officials of the Wetmore & Morse Granite Co. to provide mechanical facilities that could be adjusted to produce and maintain, on a manufacturing basis, the desired result without undue influence of the human element in the drill-steel shop. This led to an investigation of all available facilities for standardizing the shop practice to such a point as to assure the constant production of a uniform product, just as a manufacturing plant might use a battery of automatic lathes to make the same piece repeatedly.

The plant, as finally designed and built, employs six men and has an approximate daily capacity of 400 channel-bar drill steels, 300 jackhammer steels, 100 broaching steels and 1,500 plug-drill steels, such steels varying in length from a few inches to upwards of 24 feet.

The mechanical equipment of the drill-steel shop consists of two drill-steel bit forging and shanking units, one combined plug-drill forging and heat-treating unit, and one heat-treating unit for the bit end of the channeler and jackhammer steels. Each of the drill-bit forging units consists of two Gilman roving trucks, one Gilman CB5 semi-muffle forging furnace equipped with automatic-control pyrometer, and one Ingersoll-Rand Model 50 drill sharpener with air-actuated punch.

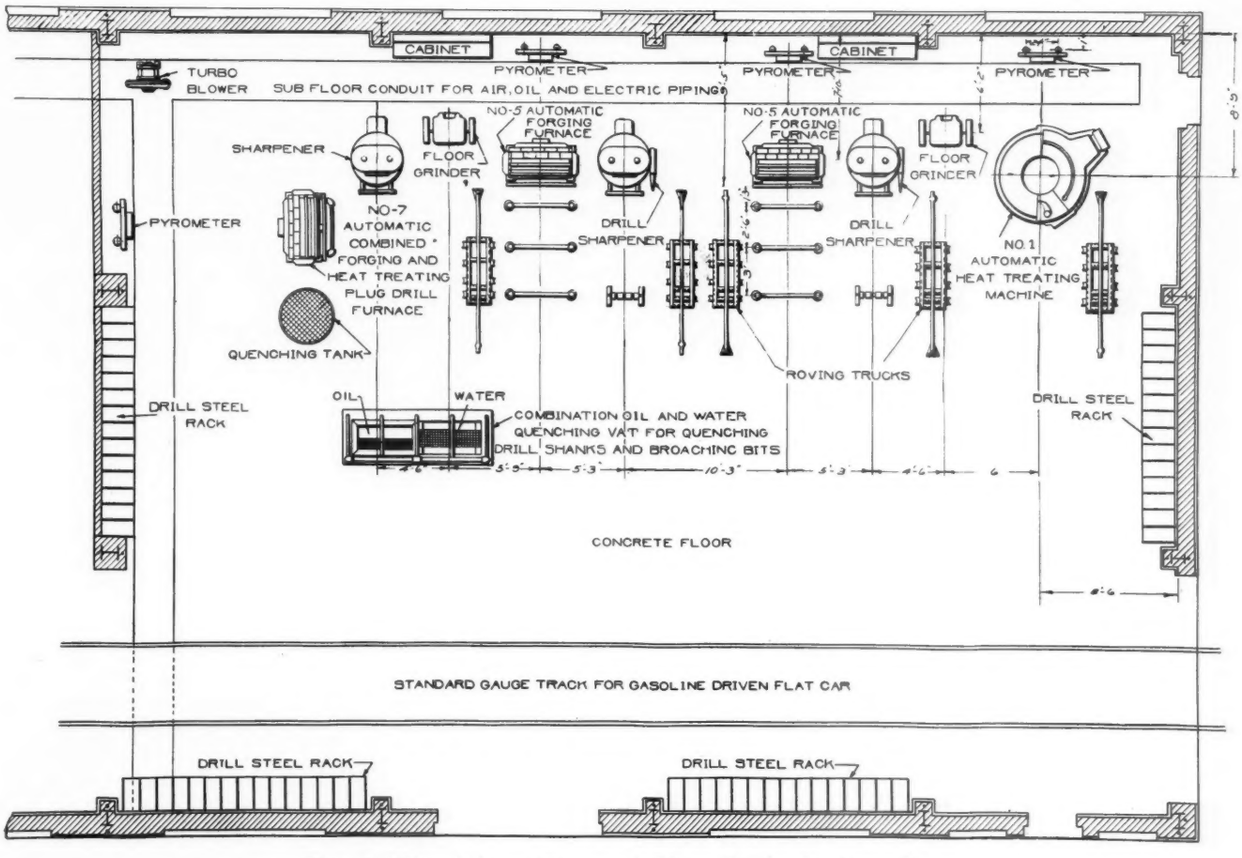
The plug-drill unit consists of one Gilman CB7 combined forging and heat-treating semi-muffle type furnace equipped with an automatic-control pyrometer, one Ingersoll-Rand 34 plug-drill sharpener and one quenching tank.

The equipment of the heat-treating unit for the bit end of channel bar and jackhammer drill steels consists of one Gilman CE21 automatic heat-treating machine equipped with an automatic control pyrometer.

Other features of the shop equipment are: a Gilman combination oil and water quenching vat with supporting rack and removable false bottoms of wire screen, so arranged that the receptacle for the quenching oil is surrounded by a tank in which cooling water is caused to circulate; two air-driven floor grinders; one finished drill-steel storage rack; one dulled-drill-steel storage rack; and one rack for the storage of finished broaching steel.

Fuel oil low in sulphur content of 32 to 38 deg. Baumé is delivered to the burners of all forging furnaces and to the furnace of the automatic heat-treating machine at a constant pressure of 12 lb. per sq. in. by gravity flow from an elevated tank of 1,000-gal. capacity. Blower air at a pressure of 10 oz. is delivered to the burner of each furnace from a turbo blower of 800-cu. ft. capacity.

In the design of the plant and the location of the equipment, care was exercised to insure a natural flow of the product, thereby minimizing the effort necessary for its internal transportation. A standard-gauge track for the gasoline-driven flat-car on which the drill steels are transported to and from




Plan of drill-steel shop. Wetmore & Morse Granite Co., Barre, Vt.

the quarries extends the entire length of the building at the west side.

The floor of the entire shop is of concrete and the relative location of each mechanical unit is such that the internal transportation of the material is accomplished most advantageously with roving trucks equipped with ball bearings.

The subfloor conduit, extending longitudinally through the building directly rearward of the drill-sharpening machines and branches leading to the various mechanical units, provide space for the air, oil, water and electric piping.

The two outstanding features of the Gilman CB5 forging furnace are:

(a) It does not oxidize nor decarburize the drill steel regardless of how long it is subjected to the maximum forging temperature of the heating chamber.

(b) The temperature of the heating chamber can be adjusted for any requirement and is maintained constant by its automatic-control pyrometer. It is a furnace that is cool for the operators and almost noiseless in operation, employing oil fuel for heating drill steel to the correct forging temperature without injury to that steel. It is a forging furnace that has been especially designed for rock-drill steel and may be installed and used in any drill-steel shop at the quarry or mine or on contract work. For successful operation fuel oil and blower air must be at constant pressures. Given these facilities, the furnace will heat the average size of drill bit to a temperature of 1,975 deg. F. at the rate of one steel every thirty seconds and will maintain this temperature indefinitely without danger of oxidizing or decarburizing the material. Its temperature control may be adjusted at will and repairing facilities are provided which greatly reduce the upkeep expense for refractory material.

The combined forging and heat-treating plug-drill furnace is similar in general design to the semi-muffle forging furnace except that, midway of its length, a partition separates the forging from the heat-treating chambers. In the forging end of the furnace, the material is heated to the required forging temperature under automatic pyrometer control. In the opposite end, the temperature of the heating chamber is reduced by baffles to insure the critical range temperature of the material being provided at all times. In the operation of forging and heat-treating plug-drill steels, it is merely necessary for the operator to insert the steel in the heating chamber of the furnace and, after forging it to the required shape, to insert the bit in the heat-treating end of the furnace which imparts to the steel just the right temperature necessary properly to harden it by plunging. It makes no difference how long the steel be left in either chamber; it will never become hotter than the temperature, either for forging or quenching, at which the pyrometer is set.

The heat-treating machine automatically heats, hardens and tempers the cutting end of the rock-drill steel. It is a self-contained unit comprising an oil-fired furnace of the semi-muffle type, a quenching tank, a loading table, an electric motor and a mechanism for transporting the drill steel from the loading table to its point of ejectment, all mounted upon a cast-iron base plate. Electric power, fuel oil and water are required. In operation the attendant merely places the unhardened drill steel in the jaws of one of the carriers of the machine. The machine transports it from the loading table into the furnace where its temperature is progressively raised until the correct heat for quenching is attained when it is quickly transferred into the quenching tank where, for a period of a few seconds, the cutting and reaming edges of the bit are subjected to a jet of cold water which imparts a case of maximum hardness and density (the desired wear-resisting qualities). Then, to provide a support for these hardened edges, a core of the required toughness is secured by slowly submerging the bit as it travels through the length of the quenching tank. When thus cooled it is raised from the quenching tank and ejected from the machine ready for use.

The savings effected by this plant are measured in several ways. This practice results in: fewer drill steels being required to produce a given footage of drill-hole, less breakage of drill steel and parts of the drilling machine, the attainment of a higher penetrative rate of the rock-drilling machine throughout its feed travel with a minimum of delays on the part of the drill operators, and a reduction in the transportation costs of the drill steel. A very important advantage is the fact that, by the employment of the equipment described herein, the drill-steel shop has been transformed from a roaring makeshift inferno to a comfortable, sanitary workshop which, from a humanitarian viewpoint, is the objective of all progressive and successful enterprises.

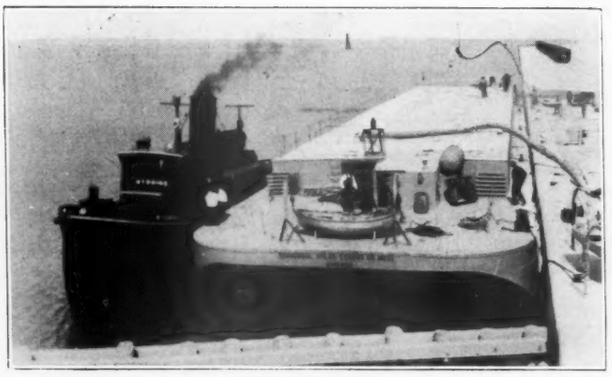
As the quarries of the Wetmore & Morse Granite Co. are, at many points, more than 150 feet deep, derricks are employed for raising or lowering the drill-steel. To facilitate this operation, the dulled drill-steel is collected from all parts of the quarry and deposited in a grout-box which, with its load, is hoisted to the surface and placed upon a gasoline-driven flat-car operating on a standard-gauge track which transports it to the interior of the drill-steel shop.

Upon arrival at the drill-steel shop, the grout-box is transferred from the flat-car to the floor of the shop by means of a compressed-air hoist suspended from a jib crane. The dulled steels, after being classified as to kind, length and gauge, are placed upon roving trucks and wheeled to their proper positions adjacent the automatic forging furnaces. If any steels are found to be plugged, bent or broken, they are treated as "cripples" and placed upon a special roving truck to be transported to the straightening bed or to the rack provided for material which is to be reworked.

Immediately a rock drill steel is forged to proper shape, it is placed upon a roving truck where it is allowed to cool to room temperature, when the truck is wheeled by hand to a point adjacent the loading

*(Continued on page 50)*

The barge tied up alongside the stone-unloading bridge at the dock in Buffington Harbor.



The barge being loaded at Buffington. The tug boat alongside hauls it to and from Milwaukee.

# Self-Unloading Cement Barge Cuts Cost of Distribution for Producer

## Universal-Atlas Vessel Operates Between Plant at Buffington, Ind., and Milwaukee

LATE last autumn the Universal-Atlas Cement Co. put into operation an interesting system designed to reduce the cost of distributing cement to the Milwaukee district. This system consists of a self-unloading barge which carries cement from the company's plants at Buffington, Ind., to a storage and packing plant in Milwaukee, Wis. The barge was launched on Nov. 15, 1930, at which time it received considerable publicity, and delivered its first load of cement at the Milwaukee terminal on Nov. 20, shortly after this unit was completed.

The barge is of all-steel construction and has the following dimensions: length, 226 ft.; beam, 40 ft.; and molded depth, 12 ft. 6 in. When loaded to a capacity of 9,500 bbl. the barge has a draft of 9 ft. 6 in. The hull was designed and fabricated by the American Bridge Co.

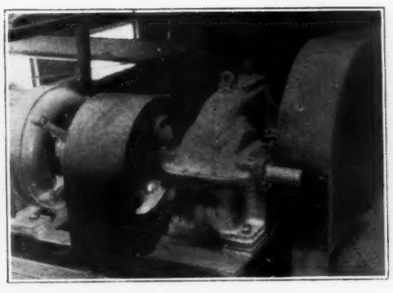
The unloading mechanism is a combination of the Leathem D. Smith tunnel scraper system and a Fuller-Kinyon cement pump. A single tunnel extends the entire length of the cargo hold. The cement feeds into this tunnel from the hold and is carried by a 4-cu. yd. Sauerman Crescent scraper to the end of the tunnel where it discharges over an incline into a steel hopper over the pump. The 10-in. Fuller-Kinyon pump conveys the cement to the shore line.

The unloading speed of about 1,000 bbl. per hour is limited by the capacity of the pump. The scraper system has a capacity of about 1,500 bbl. per hour which insures an ample and steady supply of cement to the pump. The cement pump is driven by a 250-hp. motor and the scraper is operated by a 2-drum hoist driven by a 100-hp. motor. Air for the pumping system is furnished by a Bury air compressor with a capacity of 1,400 cu. ft. per min. This is driven by a 250-hp. motor. General Electric motors are standard on the barge.

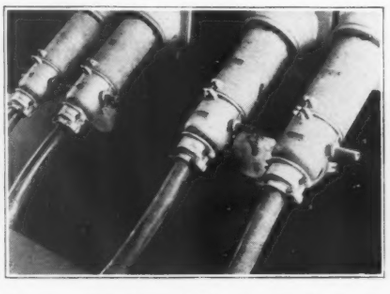
Loading of the barge, of course, is entirely dustless. When unloading, however, considerable dust is raised which is collected by a Parsons Thompson bag-type dust arrestor. This installation also serves another purpose. The scraper hoist is so located that the operator can look through an opening in the tunnel wall and watch the scraper. The dust collector draws the dust through the tunnel away from the operator, thus giving him a clear view at all times. A Buffalo Size 40 fan, direct-connected to a 5-hp. motor, furnishes the suction. The dust collector discharges to a screw conveyor which feeds the recovered cement back into the tunnel.

Cement is loaded into the barge at Buffington direct from the finish-grinding mills. A 10-in.

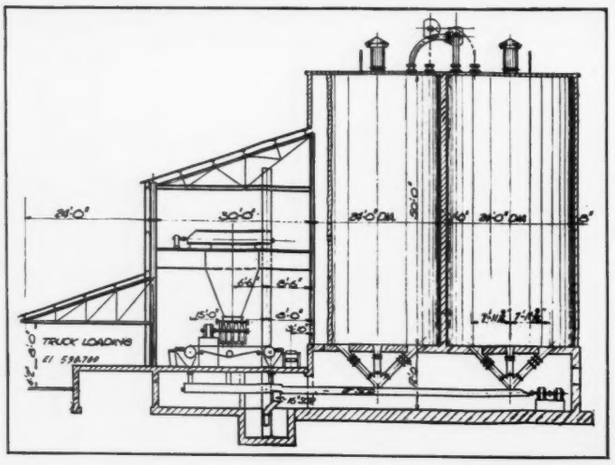
The distributing valves and pipes above the cement-storage silos.



Speed-reducer drive of one of the bucket elevators on the barge.



The special plugs which connect the barge power cables to the shore.

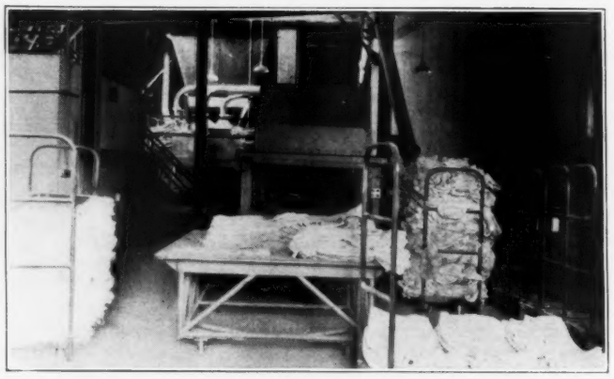



Cross-section of the storage-and-packing plant.

Fuller-Kinyon pump conveys the cement 1,064 ft. through an underground line to a booster pump of the same size which conveys it the remaining 990 ft. to the dock. This system has a loading capacity of about 1,000 bbl. per hour. The barge ties up at the 1,800 ft. concrete dock at Buffington Harbor which was built in 1927 to facilitate the unloading of boats which bring cement rock for the plant from northern Michigan.

The barge is towed from the harbor at Buffington to Milwaukee by a hired tug. The 105-mile trip is usually made in from 12 to 14 hours, depending on the weather encountered and the power of the tugboat. The distributing plant is located on the south side of the Menominee River at 712 W. Canal St., less than ½ mile south of the downtown district of Milwaukee. The property has a 546-ft. frontage on the river and a 420-ft. frontage on the east side on Holton's Canal which runs off of the river. The barge is tied up at a 288-ft. concrete dock on the river side.

The Milwaukee plant consists of ten concrete storage silos in two rows of five. These have an inside diameter of 24 ft. with an inside height of 50 ft. The interstices are not used. These silos have a total capacity of 50,000 bbl. Special 3-ft. vents in the top of each silo allow aeration of the silos without loss of cement. Alongside the silos are the packing and sack-storage rooms.



A view of the packing room from the sack-storage room. Bag cleaner in center.

Alongside the dock is a neat concrete and steel power house which supplies the current for operating all the barge mechanisms. Current is delivered from a switchboard through four Crouse-Hinds Arktite circuit-breaking plug receptacles to four in-

Handling sacks from the special packer platform onto trucks for loading.

The Milwaukee plant from the southwest.

sulated power cables to the barge. Three of these are necessary because 3-phase current is used and the fourth is an auxiliary.

The barge unloading mechanism is connected to a Goodyear dredge hose at the dock. This feeds the pipe-line to storage which is underground and is covered with removable concrete covers so that it is accessible at all times. This line is 500 ft. long and has a head of 60 ft. at the silos. The usual system of pipes and valves distributes the cement into the desired silos.

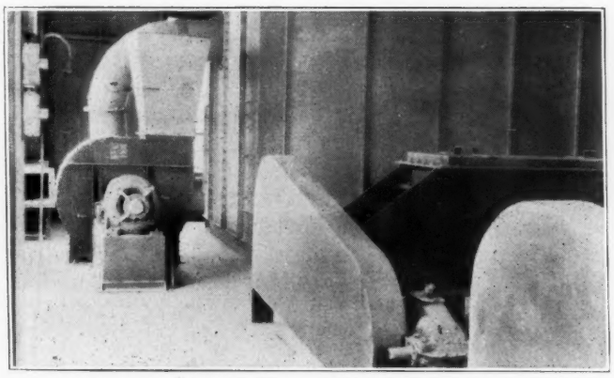
The silos feed through individual 5-way spouts to five 12-in. screw conveyors, one for each pair of

silos. These feed to a 16-in. screw conveyor running lengthways of the silos. This discharges to two steel-inclosed bucket elevators which, in turn, discharge to two 18-in. screen-screw conveyors. The cement passing these screens goes to the two Bates packer bins. One of the elevators is arranged so that it can also discharge to two 12-in. screw conveyors, the second at right angles to the first. These feed to a 111-bbl.-capacity steel storage bin in a small steel building near the truck-loading platform. A 10,000-lb.-capacity Blaw-Knox weighing batcher under this bin loads bulk cement into trucks.

Each of the two four-tube Bates packers is driven

A view of the Milwaukee plant from the northeast. Bulk loading bin and truck-loading platform at right.

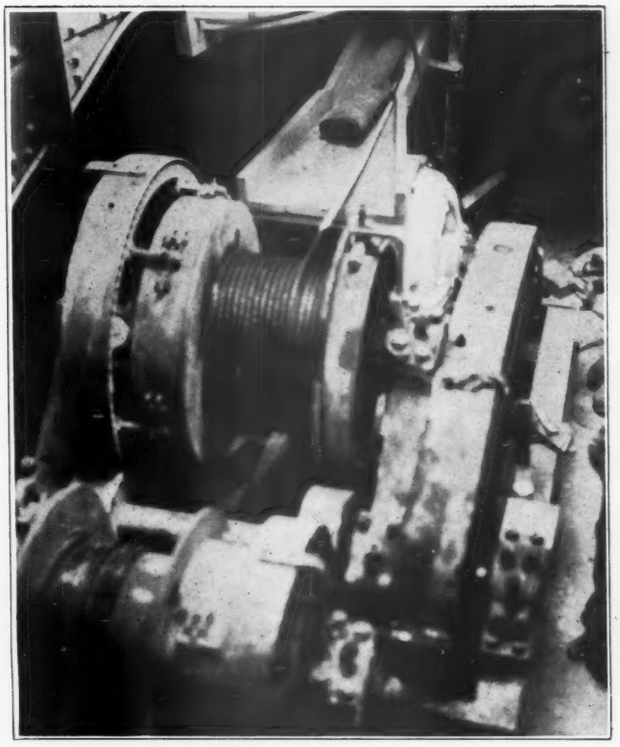
by a 30-hp. Wagner Fynn-Weichsel synchronous motor. The five collecting screws are driven by 10-hp. motors, the tunnel screw by a 20-hp. motor, and the screen screws by 5-hp. motors. The two bulk-



The dust-collecting unit in the packing plant with fan at left. Screw conveyor and drive at right.

loading screws are driven, through an angle gear drive, by one 20-hp. motor. All the screw conveyors are driven through Falk herringbone speed reducers by Allis-Chalmers Type A-R induction motors.

The packers discharge to short reversible belt conveyors. At one end these discharge to special tables which allow the sacks to be loaded directly onto hand trucks without rehandling. Trucks are loaded from a specially-designed loading platform. This has a saw-tooth arrangement which allows a number of trucks to be loaded at one time without interference. This platform eliminates the necessity of backing the trucks up to the platform at a 90-deg.



The two-drum hoist in the hold of the barge which operates the scraper unloading system.

angle as is the customary practice. A 200-lb.-capacity Howe automatic dial scale in the packing room is used for checking bag weights.

When cars are being loaded the reversible conveyors discharge the sacks to a 52-ft. horizontal belt conveyor. This, in turn, feeds a 40-ft. belt conveyor to the car-loading platform. The same arrangement for loading with hand trucks is used here. Each of these conveyors is driven by a 5-hp. Allis-Chalmers motor through Falk speed reducers. Goodyear conveyor belting is used on all belt conveyors.

Adjoining the packing room is the sack-room. Here the returned sacks are cleaned, repaired and stored. A bag-cleaner of the company's own design and make and several swing machines comprise the equipment used. The bag cleaner is driven by a 10-hp. Allis-Chalmers motor through a Falk speed reducer. A Buffalo Size 20 exhauster fan driven by a 3-hp. motor conveys all dust raised in this operation to the main dust-collecting system. The Parsons Thompson Engineering Co. bag-type dust arrestor is on the second floor of the packing room. It collects dust from the packers, screw conveyors, and elevators as well as from the sack cleaner. The Buffalo Size 40 fan used on this unit is driven by a 40-hp. motor and the bag-shaking mechanism by a 2-hp. motor.

The electrical control of the loading and packing equipment is so designed that any breakdown of one of these units will cause the least possible amount of delay. If the main screw conveyor under the silos should go out of commission, a selector switch

(*Continued on page 50*)

*Prof. A. C. Busse.*

# How to Win an Argument

By A. C. BUSSE and E. E. NYBERG
*New York University, New York*

*The first part of this intensely interesting sales address, published in the last issue of* PIT AND QUARRY, *must be read before one can fully appreciate this concluding part. Prof. Busse handled the preceding portion and discussed the first two principles which should guide salesmen in their business arguments. The remaining four principles are in the dialogue herewith.—Editor.*

*Prof. E. E. Nyberg.*

BUSSE: *Principle No. 3.* During the course of a business argument, watch that you don't slip into an argumentative manner that is belligerent or overpositive. I wish I had some good way of illustrating that. Suppose I get into an argument with Nyberg over his choice of a dialogue. What are you using, Nyberg?

NYBERG: The farm dialogue.

BUSSE: What?

NYBERG: The farm dialogue.

BUSSE: The farm dialogue! Why, we are out here talking to people interested in the sale of crushed stone and allied products, and you want to talk about farm products. [*In an argumentative tone of voice*] Can't you find something better than that? [*Nyberg gives Busse a disgusted look.*]

You see, Nyberg knew I was doing that by way of an extempore illustration. But you saw him. Even then he gave me a dirty look. Now, I know that not a single man in this room would talk to a prospect the way I just talked to Nyberg. You wouldn't say anything like that; in so many words, you wouldn't! But given the right provocation (and you often get it), it is entirely possible that you would slip, without knowing you were doing it, into an argumentative manner that would imply every single word of what I said to Nyberg, and the implication is worse than actually putting it in words because it gives the other man a chance to imagine what it was that you would have said to him under different circumstances.

If that seems incredible to you, I wish you would check up on us. Sometime when you have nothing to do, take seven and one-half years off—maybe this period of economic depression would be a good time—and sit back and watch sales solicitation *en masse* go by. Then you will appreciate things you couldn't possibly realize in a few isolated instances, certainly in those instances with which you were connected. You will realize how easy it is for a salesman who is naturally anxious to please this prospect on the other side of the table, because, doggone him, his bread and butter depends on pleasing this man: you will realize with what almost fatal facility this salesman, without knowing he is doing it, slips into an argumentative manner. You will realize how easy it is for him to raise his voice without knowing he is doing it; how easy to let a note of harsh, intolerant, snooty finality creep into the counter-assertions of his sales solicitation; how easy to sneer at the prospect without even suspecting that he is doing it. The moral here is obvious. If you are going to win your business arguments, you must consciously apply these principles as though they constituted the most important psychological strategy you ever lay awake at night thinking about and trying to understand.

Now suppose we illustrate the first three principles. [*After conference*] Nyberg insists upon taking the farm dialogue after all and maybe he is right. He says we are interested in explaining strategy to you and not in selling points. He says that, if we introduced a solicitation or a dialogue which included a number of selling points of interest to a number of you, your attention would be distracted.

This dialogue took place some time ago in a hotel room in Washington. It doesn't deal with the sale of tangible products at all, but with the sale of an idea. There was a party of congressmen in this hotel room, and one of us.

Congressman Busse is in favor of a farm-relief bill which will appear soon on the floor for debate. Congressman Nyberg is opposed to it and I am going to try to change his mind and get him to support it. The setting isn't just right. This should be a hotel room with all the appurtenances if you know what I mean. I should be more corpulent, wear a frayed frock coat, and smoke a pipe or cigar. Hasn't anybody a cigar? [*Nyberg reluctantly passes him a cigar.*] Now I want you to notice this, that Congressman Nyberg insists on doing most of the talking himself, which is unfortunate, because he has a cold this morning. Not only that, but he insists on interrupting at the slightest provocation, and is argumentative and belligerent. Notice how the sales solicitation ends.

Nyberg is seated over here. I approach him and say:

CONGRESSMAN BUSSE: Well, Nyberg, I have been spending a lot of time studying the farm problem. I believe we should back the agricultural bill when it is introduced in the House. The welfare of the nation demands that it be enacted into law.

CONGRESSMAN NYBERG: Well, getting excited are you? What do you mean, welfare of the nation? Don't you . . .

CONGRESSMAN BUSSE: Oh, so you are against the measure?

CONGRESSMAN NYBERG: Why, of course, I am. Why shouldn't I be? Have you studied the evil effects of class legislation?

CONGRESSMAN BUSSE: I certainly have, Nyberg, and I know something about the present condition

of the farmer, too. Do you know that in 1924—and I am quoting figures from the Department of Agriculture now—four out of five mortgaged farms in the Middle West were in the hands of the receivers?

CONGRESSMAN NYBERG: Yes, I know all that, but what is going . . .

CONGRESSMAN BUSSE: Let me tell you something about the farmer. During the World War he was the most patriotic of all our American citizens. He made enormous sacrifices to meet the Government's demands for foodstuffs.

CONGRESSMAN NYBERG: Of course, of course, I understand the farmer's position . . .

CONGRESSMAN BUSSE: And what does the farmer get for it? They are awarding him a tariff bill that probably protects the farmer growing narcissus bulbs. That's what . . .

CONGRESSMAN NYBERG: Busse, don't you understand the tariff that was passed . . .

CONGRESSMAN BUSSE: Yes, I do know, Nyberg, and I know that the farmer has to sell his produce for what he can get. It is a dirty shame. It is very well for fellows like you to laugh at the farmer. But listen, man, you are narrow-minded. You don't stop to realize that agriculture and industry sleep in the same bed, and you can't freeze one without freezing the other. Some day you fellows will learn that!

CONGRESSMAN NYBERG: Well, Busse, I am entirely agreed that the farmer has his problems, but . . .

CONGRESSMAN BUSSE: Now wait a minute! Let me say a word here. You are just trying to wiggle out of an uncomfortable position. You don't seem to understand there are 40,000,000 people bound up in agriculture in the United States today, and there is a surplus of crops that would astound you. It doesn't pay those folks to raise crops any more. Now, what is going to happen to 40,000,000 people unless the government steps in and . . .

CONGRESSMAN NYBERG: Oh, for goodness sake, why can't you get it into that head of yours . . .

CONGRESSMAN BUSSE: Oh, yes, that's it! Get sore!

CONGRESSMAN NYBERG: I am not sore!

CONGRESSMAN BUSSE: No, you are not sore! You are on the wrong side of the argument, and you know it. That is what is the matter with you. Listen to me! The farmer is out to get a fair price so he can pay his notes in the bank and look the world squarely in the face, but you want to keep him down, don't you?

CONGRESSMAN NYBERG: Well, there is certainly no use in talking to you.

CONGRESSMAN BUSSE: You bet there isn't! I know when I am right, and God Almighty can't make me change my mind.

CONGRESSMAN NYBERG: Neither can I then. But get this special class legislation out of your head. It won't get any sympathy from me.

CONGRESSMAN BUSSE: Oh, yeah!

CONGRESSMAN NYBERG: Yeah!

CONGRESSMAN BUSSE: (*Aside.*) Well, I guess I told that big sap where to get off, didn't I?

BUSSE: That sales solicitation did not turn out so well, not because the man whose part I took was ignorant, not at all. There was a man who is fluent, who has a likable personality, a man who probably knows more about the farm situation today than any other man in the country. I wish I could be rash enough to tell you his name. Everyone of you would recognize it.

Why did he fail? Because as Confucius said, a great many years ago, "Men do not trip on mountains; they trip on molehills." And it is true. We have seen many a salesman who was admirably able to get over a mountain of resistance in order to get a crack at an interview at all, but who would trip on his nose pitifully on the little controversial frailties which we are taking the time to discuss.

Right now it occurs to me that I should let you know that Nyberg and I are not disillusioned about the value of the science of selling. We know you can't ever reduce that great, ancient art of selling to the mere domestic status of a science. Every time I get too cocky about that, I recall an experience I had during the World War. I will recount it briefly, because it illustrates the point well.

It was noticed that the white boys who were enrolled during the period of the draft took out, almost as a matter of course, the Government insurance policies offered, having the premiums deducted from their monthly incomes. And it was noticed, with a good deal of alarm, that the colored boys who came in didn't take out the Government insurance policies in any such casual manner. The powers that be thought the situation so alarming that they established a flying corps of officers to go before the colored contingents to sell to them the idea of taking out Government insurance. Being one of the officers appointed to that rather unique task, I approached my job with sublime confidence in the orthodox and scientific principles of selling. I prepared a speech that I thought was a knock-out. I pictured to them that it was not only possible but an eminent probability that, within six weeks, every one of them would be lying dead on some battlefield in France. I thought that was a good way to get their attention. And I thought that attention would ripen into interest by saying then, "Now what is going to happen to all the dependents you can recall back home, when they discover they are without any means of income?" I thought I would let interest be turned into desire and action by pointing out that the Government insurance policies were the only way of safeguarding those people back home.

Well—it didn't work. I just couldn't get going on that at all. One morning I was approached by a colored doughboy. I can not imitate his dialect, but what he said was something like this: "Boss, if you don't mind my sayin' it, I think you are just not pressin' the right button on that insurance business. I don't know anything about insurance or speaking, but if you give me a couple of minutes, I think I can help you."

I was sufficiently low to give him a chance. He got up on the platform the next morning and said something like this: "Colored gentlemen, you are

all in Uncle Sam's Army now and you are all going to France. Now, over in France, Uncle Sam has two kinds of colored boys. One kind he puts way up in the front-line trenches where the shooting is going on, and the other kind he puts way back of the lines about ten miles back taking care of the mules. I want you to stop and think for a minute. If every time a colored boy is killed, Uncle Sam has to reach way down in his pants for $10,000, where do you think he am going to put those insurance Niggers—way up in the front trenches, or way in the back?"

But there is something of value in the science of selling, and we are not averse to giving it to you.

*Principle No. 4* constitutes the nuclear principle in the second group, as Principle No. 1 did in the first. It is this: during the opening phases of a business argument, inquire rather than attack. Inquire first, attack afterward. What does that mean? It means just this when your prospect opens up with an important objection, don't you hop right in to tell him why you think he is all wrong. Rather invite him to tell you for your complete information (because this is something that is rather new to you, we will say) why he thinks he is right. Ask him if he has any other important objections. Then you can attack and you can attack intelligently. If you inquire before you attack, you gain two mighty fine strategic advantages.

In the first place, if you inquire before you attack, you get your prospect to disarm himself figuratively, to shoot off all his heavy guns during the first and psychologically indecisive half of the argument, so that, during the second and psychologically decisive half, that fellow has no other alternative but to sit back and listen to you with at least something of the same spirit of inquiring reasonableness which you previously used in listening to him.

The second advantage is probably even more important. If you will inquire before you attack, by the time you are ready to attack you will have all the information necessary carefully to organize and direct that attack of yours at just the right point for this particular prospect. Never mind what someone else's objection was. Never mind what another man's selling point was. This man, if you apply diplomatically the principle of inquiry, will tell you what it is you have to do to sell *him*. In short, he will help you make the sale. And that is of such importance as an advantage that it deserves to be safeguarded. And it can be secured and safeguarded by the application of Principle No. 5.

*Principle No. 5.* During the course of a business argument be sure every time your prospect states and explains an important objection that you restate it, clearly and fairly in your own words.

I said that it was the wisest strategy to inquire, to get your prospect to talk himself out. But there was one attendant danger which I didn't mention. That talking out process may take too long. Your prospect may not be content to state each objection just once. He may want to state it again, feeling after the first explanation (if you start right in selling), "My dear boy, you couldn't have understood the full validity of that objection or you would not be so utterly stupid as to persist in your attempt to make the sale. I guess I will have to state it again so you will get it."

We have heard prospects state objections half a dozen times, not only one but many of them, hoping for additional clarity and emphasis with every repetition, while the precious minutes flew away. In that kind of solicitation, the only thing your salesman can do is say, "Hello" and "Goodbye."

There is one way to nip in the bud your prospect's fatal tendency toward time-consuming repetition, and that is by the application of Principle No. 5. If you restate your prospect's objections clearly and fairly in your own words as soon as he has finished the explanation, what do you do? You give that man a convincing guarantee that you have understood that objection of his, and not only that, but you understand the objection quite as well as he does, if not better.

Then if you still persist in your attempt to make the sale, he feels that it must be because you have information which he ought to have. One of the best salesmen we ever heard in all our observation was a man who applied this principle up to the hilt. When a prospect of his would state an objection, this fellow would try to state it more effectively—more sensibly than the prospect himself did, with the result that, in a comparatively short time, he had his prospect so completely talked out that the prospect would sit there in what seemed to us to be a state of mental paralysis. It wasn't mental paralysis at all: it was a state of receptivity, which the man seized as an opportunity and put to work.

Principles No. 4 and No. 5 lead logically, climactically to *Principle No. 6.* After all this inquiring and maneuvering is over and your prospect of his own initiative has designated some one key objection as of overshadowing importance, when you have unearthed that key issue, nail it on the boards and stick to it through thick and thin for the remainder of the argument. Don't digress yourself and don't permit your prospect to get you on a side issue. If he does it, you can always tell him you will be glad to take that up in due time. But ask him to postpone its consideration for the time being and then—back to the main highway. If you do that, you stand your best chance of clinching the average sales solicitation within the time limits of a single interview, because the human mind is so constituted that it is hard for the man considering the expenditure of a large sum of money to make up his mind on short notice if his decision must rest on the analysis of more than one central consideration.

If you have more than one central consideration, more than one issue in the arena of discussion during the closing time of an interview, if you have two or three, or a half dozen or all your sales points in the arena of discussion as the interview closes, what happens? Just this: the mind of your prospect tends to hop around from one to the other and back again and finally to make a definite decision on nothing.

The case, then, is a good deal like that crazy law-

suit that took place in Kentucky some time ago. Maybe you read about it because it was rather widely reported in the newspapers. One mountaineer, Williams, loaned a water pail to his neighbor, Johnson. When Johnson gave the pail back, Williams said there was a hole in it. Johnson said he didn't put the hole in it and he would not pay to have the hole repaired. The case got into the courts, for the principle of this thing and not for the money. The only interesting feature about the case was Johnson's defense when the case came to trial—a defense which he based not on one key issue, such as we recommended, but on three. He was innocent, he claimed, in the first place because the hole was not in the pail when he gave it back. He was innocent in the second place because the hole was already in the pail when he borrowed it. He was innocent in the third place, because he never borrowed the damn pail at all.

Or take Nyberg's case. Last night we were at the Statler, and we met some people we knew. They invited us to their room. One fellow said, "Say, will you have a drink?" Nyberg said, "No, I won't take a drink." They said, "Why?" He said, "For three reasons, if you want to know. I promised my mother many years ago that I would never take a drink (if I may be confidential, Mr. Chairman). In the second place, it is too early in the evening; and anyway, I have just had a drink."

Now we are just going to take the time, if you will give us a few minutes longer, to illustrate the last principle, the sixth one. And probably it is important enough to deserve special consideration. Here likewise is an illustration that took place some time ago, as will at once become apparent to you. These dialogues not only actually happened, but they are beautifully typical of hundreds and hundreds of sales solicitations we have on file. In this particular case, Nyberg will reënact the role of the head of a retail furniture establishment in New York City. I shall represent the sales manager. This furniture store of ours has been working on the cash basis for 50 years, but I have seen the installment people building up a tremendous volume, and I think we ought to give it a trial.

Because of a previous engagement I can talk to Nyberg only five minutes. Perhaps I should not attempt this interview at all—but if I have a ghost of a chance to do anything with that man in five minutes, knowing at the outset that he is against it, it certainly lies in almost immediately establishing a key issue and sticking to it like a burr for the remainder of the argument. But you will notice how easily we get off the trail and how the discussion ends.

SALES MANAGER BUSSE: Good morning, Mr. Nyberg, if you can spare a little time, I would like to get your opinion on a matter that has been bothering me for quite a while.

MR. NYBERG: All right, go ahead. I can give you only five minutes now, though.

SALES MANAGER BUSSE: Well, to get right to the point, I think we ought to adopt a new sales policy. We have been a cash house now for the past fifty years but, for the past five years, we haven't been holding our own with our competitors. The old plan isn't working out and I think we ought to try the installment plan.

MR. NYBERG: I have considered the installment plan, Busse, and we can't afford to change our policy of pay-as-you-go. There's no use talking.

SALES MANAGER BUSSE: But our business isn't what it ought to be. Most of the installment houses . . .

MR. NYBERG: I don't care anything about the other houses.

SALES MANAGER BUSSE: But don't you see, that it is the installment plan of sales that has brought them more business.

MR. NYBERG: Oh, those houses are simply lucky, Busse. You can't count on these chase-me customers. The doctor gets his and the movies get theirs and the drug stores and *if* there is any money left, mind you, we get a little of that. Look what happened in Pennsylvania during the coal strike.

SALES MANAGER BUSSE: Yes, but look here, Pennsylvania is a long way away. Anyway, we aren't selling to coal miners. We are selling to salaried folks who don't lose their jobs every time that Lewis decides to . . .

MR. NYBERG: Oh, of course we are not selling to them, but see what happened to the men who do sell them . . .

SALES MANAGER BUSSE: Yes, but . . .

MR. NYBERG: They had to declare a moratorium, on their debts for the period of the strike. Why, millions were lost in interest, Busse, millions!

SALES MANAGER BUSSE: Wait a minute . . .

MR. NYBERG: I wouldn't sell to miners on the installment plan for anything. I want to eat, too, . . .

SALES MANAGER BUSSE: Now look here . . .

MR. NYBERG: And if they want to sit on our chairs they can pay as they go or sit on the floor. Look what happened during the coal strike; people laid off for over a year, and then they expect sympathy. And who won the strike, anyway, Busse?

SALES MANAGER BUSSE: Well, we didn't, that's sure. I guess everybody lost except the oil people. Do you know what I think, Nyberg? I think there ought to be compulsory arbitration to keep the fellows from wrecking that industry. What did Lewis accomplish with all his chatter, anyway?

MR. NYBERG: Why, what did anybody accomplish? If it hadn't been for that man Grant of Cleveland stepping in and using horse sense we would still be talking and reading newspaper headlines.

SALES MANAGER BUSSE: Say—let me tell you something about that. Grant didn't have anything to do with settling that coal strike. That was just publicity stuff. Secretary Davis is the man who settled it.

MR. NYBERG: Why, Secretary Davis nothing. You know the Coolidge policy. Hands off! Hands off! That is it. Coolidge didn't want to lose votes in Pennsylvania. That is why he kept his hands off. This "don't choose to run" stuff is nonsense.

SALES MANAGER BUSSE: Listen man, listen here! Coolidge doesn't have to worry about the next presidential election. If he wants to run he's as good as elected now. Look at taxation. He won that issue in the Senate hands down. He wanted to keep us out of the World Court and we're out, aren't we? He hasn't a thing in the world to worry about . . .

MR. NYBERG: I'm not so sure about that, Busse. You're one of the hereditary Republicans. Now you take Al Smith. One of the most popular men of the country today. He has gone Coolidge on every issue and then gone him one better.

SALES MANAGER BUSSE: Yes, Nyberg, but don't forget the last Democratic convention in Madison Square Gardens. The South will have something to say about Al Smith, and the West, too. You know what will happen. The minute Al Smith announces his candidacy, MacAdoo will announce his, and you will have the same Democratic deadlock all over again.

MR. NYBERG: Oh, no! Why, good heavens, Busse, I have an appointment! Say, what was that you wanted to talk to me about?

SALES MANAGER BUSSE: (Stopping to think) Oh, the installment plan of sales.

MR. NYBERG: Get it out of your head. No use talking about it.

BUSSE: Well, that solicitation didn't turn out so well, either. We are not going to take the time to comment upon that. The moral is obvious.

What we have told you today doesn't constitute the whole story of salesmanship. More important than the six principles put together, we think is the knowledge of the product and knowledge of the market you are selling it in, and no amount of conversational strategy can make up for it. Yet, you know we have to stress that in our classes, back in New York University.

When we first give the boys in the University this stuff, they are tickled to death. I know that the boy in the corner is thinking, as he smiles and nudges his neighbor: The next time I have to put on a sales demonstration, I am not going to be stuck for a couple of hours downtown in the library or in some business or association office looking up a lot of facts or figures about my product or my market. I will just go into the class room prepared not to do too much talking or get hot or excited or interrupt the other fellow. I will ask him some questions, restate his objections and say a couple of words about a key issue that may have developed of its own accord.

We tell them, when the time comes to put on their demonstrations, that, if they don't know their product and market, never to mind the conversational strategy, just to keep their mouths shut. We give them the same advice I noticed that Beatrice Fairfax gave in her column of advice to the lovelorn a few nights ago. Perhaps some of you married men who read that column will recall it. A reader in difficulty (a woman) had a serious love problem. She wrote: "Dear Miss Fairfax: I am engaged to be married but I have false teeth. What shall I do? Shall I tell my fiance *now* that I have false teeth and risk having him call off the engagement, or shall I wait until we are married and let him find out for himself, and run the risk of the possible scandal of divorce?"

Miss Fairfax's answer was direct and to the point: "Marry the man and keep your mouth shut!"

## Barge Cuts Cost of Distribution

(*Continued from page 45*)

arrangement automatically shuts off all the feeder screw conveyors except the two which feed directly to the elevators. If one of these two feed screws or one of the elevators fails, the other will take the load and keep the plant going. Another selector switch allows one of the elevators and the two bulk-loading screws to continue operations if one of the screen screws or packers fails.

The entire plant is of concrete and steel construction, very neat in appearance, and is kept immaculate by the dust-collecting unit. Concrete runways for the trucks make this plant independent of weather conditions. The plant was designed by the engineering department of the Universal-Atlas Cement Co. and was built by the Worden-Allen Co.

## The Care and Upkeep of Drill Steel

(*Continued from page 42*)

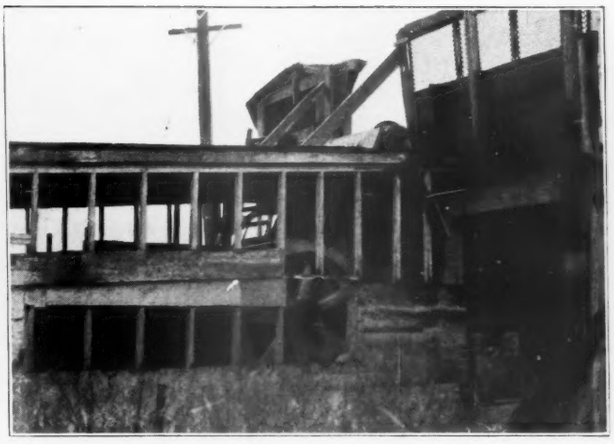
platform of the automatic heat-treating machine from which the steels are removed by the attendant and inserted in carriers of the machine. After being heated, quenched and tempered automatically, the steel is then deposited in the outgoing grout-box or is placed in the finished drill-steel storage rack, ready for use.

In the making of new drill-steel or when it is necessary to reshank steel, the bars after being cut to length and transferred by a roving truck to the furnace, are heated to the required forging temperature, and are forged, after which they are placed upon a roving truck and allowed to cool to room temperature, which has the effect of removing forging strains and of refining the grain structure. The shank ends are then ready to be heat-treated.

## Sand, Mixed with Calcium Chloride Used on Icy Highways

A new use for fine sand has been discovered and developed by the Minnesota state highway department during the past winter. The sand and calcium chloride were mixed and strewn on icy roads to lower the accident hazard caused by skidding vehicles. A solution of 100 lb. of calcium chloride to 13 gal. of water was mixed and used for saturating storage piles of sand. This was later spread on the ice-covered highways in a number of sections in the state. Treated in this manner, the sand becomes imbedded in the ice and is not swept away by the wind or by passing cars.

Steam shovel loading trucks in gravel pit for haulage to plant.



A close-up view of the 42-in. by 48-in. primary jaw crusher.

# Unusual Deposit Permits Production of Complete Range of Aggregates

## Sand-and-Gravel and Crushed-Stone Plants at Saugus, Mass., Are Only 200 Feet Apart

THERE are many operators in this country who produce both crushed stone and sand and gravel, but these are generally from separate plants a long distance apart. There are a few whose deposits of stone and gravel are close together. In the case of the Saugus Sand & Stone Co., of Saugus, Mass., the deposits adjoin and the plants are only 200 ft. apart.

The property owned by the company is located about 10 miles north of the heart of Boston and consists of 60 acres, of which about half is gravel and the other half rock. The overburden is very light. The stone, which is a hard traprock, is in the form of a ledge which slopes from about 170 ft. above ground level at one end of the property to a considerable depth below this level at the other end. The gravel deposit begins at the point where the ledge goes below the surface.

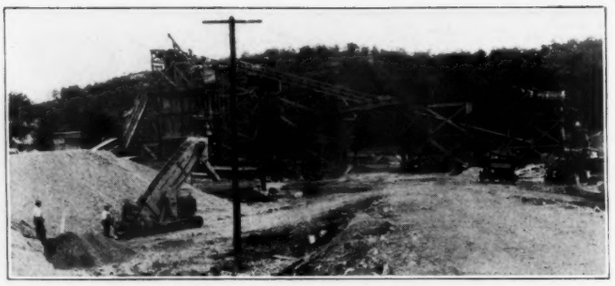
Both materials pass the most stringent tests and are accepted for all city, state and federal work. The gravel deposit is rather coarse for the first 20 ft., having only 20 per cent sand. Below this point, which is the ground water level, the content is about 60 per cent sand.

The quarry face at present ranges from 50 to 75 ft. in height. Drilling of blastholes is done with a Sanderson Cyclone well drill and an Ingersoll-Rand drifter drill. As the quarry is half a mile from any residence and a safe distance from any highway, shots of fairly large size are made. An Erie ¾-cu. yd. steam shovel loads the stone into trucks to be hauled to the plant.

The trucks discharge directly into the New England 42-in. by 48-in. jaw primary crusher which is belt driven by a 250-hp. Allis-Chalmers motor. This crusher has a patented type of steel frame and is

A view showing gravel plant at left and crushed-stone plant at right. The quarry with one of the well drills is visible in the background. The gravel pit to the left of the gravel plant is not visible in this picture.

Another view of the gravel plant illustrating the return-conveyor system.



Another view of the crushed-stone plant with a stock-pile loader in foreground.

probably the largest crusher of its type in existence. It discharges to a 36-in. inclined belt conveyor on 70-ft. centers which feeds the Allis-Chalmers McCully No. 8 gyratory secondary crusher. This is belt driven by a 75-hp. General Electric motor and discharges onto a 30-in. belt conveyor on 146-ft. centers. This conveyor is inclined for the greater part of its length and becomes horizontal near its end where it discharges to a 60-in. by 10-ft. rotary scalping screen with 2¾-in. perforations.

The oversize goes to a Kennedy-Van Saun No. 37 gearless gyratory crusher for reduction. The product of this crusher and the material passing through the scalping screen discharge to a 24-in. inclined belt conveyor on 165-ft. centers which takes the material to the top of the screening plant. Here it discharges to a 60-in. by 26-ft. revolving sizing screen equipped with a dust jacket. The various sizes produced drop to a 6-compartment timber bin with a total capacity of 1,000 tons. Trucks are loaded through clamshell gates under the bins. Provision is made so that tailings can be drawn from the bins into trucks and discharged onto the conveyor to the secondary crusher for reduction.

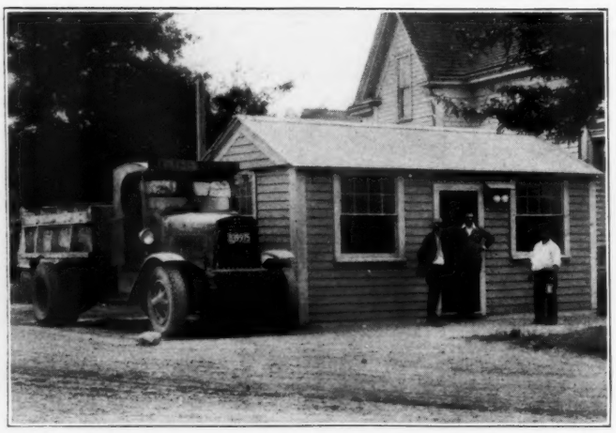
In the gravel pit an Erie ¾-cu. yd. steam shovel loads to trucks which haul the gravel to the plant hopper. A reciprocating feeder discharges onto a 20-in. inclined belt conveyor. This discharges over a rail grizzly into the New England 14-in. by 28-in. jaw crusher. The crusher discharge and the material passing through the rail grizzly discharge to a second inclined belt conveyor which feeds to a 48-in. by 20-ft. revolving screen with a sand jacket. The sized gravel discharges directly to bins. The sand goes to a screw dewaterer and then into bins. The oversize goes to a series of two belt conveyors which discharge to a 9-in. by 15-in. Farrel jaw crusher. The crushed material drops onto the main conveyor back to the revolving screen. The gravel bins have a total capacity of 300 tons.

Any excess sized stone or gravel is stock-piled by trucks using the ramp method. This material is recovered and loaded into trucks for shipment by two stock-pile loaders, a New England No. 3 and a Nelson. All shipments are made by truck, the company owning eight Sterling 5-ton trucks and two Hug 5-ton trucks. These are used for plant purposes as well as for deliveries. Shipments are weighed on a Fairbanks 15-ton scale at the plant office.

The sand and gravel plant is the older of the two and went into operation in April, 1926. In 1928 this plant was rebuilt and enlarged. The crushed stone plant was completed in April, 1928, and was rebuilt and again put into operation in May, 1930. Most of the equipment for these plants, including conveyors, crushers, bin gates, drives, etc., was furnished by the New England Road Machinery Co. The gravel plant has a capacity of 60 tons per hr. and the stone plant of 100 tons per hr. Goodyear drive and conveyor belts are used exclusively. Most of the motors and electrical equipment were furnished by the General Electric Co.

Officers of the company are: Harry Stabile, president; Paul Caputo, treasurer and superintendent; E. J. Lonergan, sales manager; and Joseph Binda, foreman.

One of the stock-pile loaders loading a truck for shipment.



A truckload of stone being weighed at the plant office.

# Is Solid Carbon-Dioxide Manufacture as a Kiln By-Product Practical?

By C. L. JONES
*Vice-President, Dry Ice Corp. of America*

THE recovery and purification of carbon-dioxide from lime kilns and from the calcination of magnesite is not a novel thought. As a matter of fact, operations manufacturing liquefied carbon-dioxide from both these sources were in more or less successful use in Europe a quarter-century ago. The early files of the German *Zeitschrift für die gesamte Kohlensäureindustrie,* as well as the American *Carbonic Acid,*[1] are replete with refererences to the technology of carbon-dioxide manufacture from lime kilns. The student interested in obtaining a complete historical background will also find an interesting description of some workable processes in *The Carbonic Acid Industry,* by J. C. Goosman.[2]

The manufacture of carbon-dioxide from lime-kiln gases has nevertheless been a dead issue in the United States for over two decades, because economic justification for such operation has been entirely lacking. Recently several lime operators and others not producing lime but attempting to exploit limestone deposits have had their interest quickened by the growth of the infant industry of solid carbon-dioxide under the trade mark "Dry Ice." It has seemed to them that the recovery of by-product $CO_2$ from their operations, actual or contemplated, for the manufacture of solid $CO_2$ might show an attractive profit, or at least help to bear some of the overhead burdens of the lime business.

Now, it is not to be denied that carbon-dioxide can be recovered at some cost from lime-kiln stack gases, nor is there any insurmountable technological difficulty in liquefying the carbon-dioxide so purified and converting it to solid form, if patent, sales, and distribution difficulties are ignored. Further, it is not difficult to figure in most parts of the United States that the manufacture of pure carbon-dioxide gas could be accomplished on a large scale from lime-kiln or magnesite-kiln gases for a small fraction of current retail solid-carbon-dioxide selling prices, provided that steady operation on a large scale, small radius of shipment, and economical selling and distribution are assumed.

Careful analysis of over a score of lime-kiln proposals within the past two years, however, has failed to disclose a single case which has established any sound present justification for solid-carbon-dioxide manufacture under such conditions from such a source. It is the purpose of this paper to discuss some of the factors that have been taken into consideration in the evaluation of the gases considered.

[1] No longer published. Formerly issued commencing January, 1905, by the Carbonic Acid Publishing Co., Brooklyn, N. Y.

[2] Published 1905 by Nickerson, Collins & Co., Chicago, Ill. Now out of print.

It is now six years since the Dry Ice Corp. of America first manufactured and sold solid carbon-dioxide for refrigeration. It chose for the product the trade mark, "Dry Ice," because it correctly supposed that the fanciful contradiction implied in coupling together two words so opposite in association for the layman would attract attention to its product. The industry is in no sense a tonnage industry, since the approximate total sales of all plants in the United States in 1930, some 30,000 tons, is less than the carbon-dioxide produced from one modern blast furnace in a single month. This represents an annual consumption of only about one-half pound per capita. The statement is frequently made loosely that Dry Ice is a "coming thing," "has a great future, "will grow fast," and with all these viewpoints the writer of this article is in the heartiest accord. It does, indeed, seem a logical refrigerant for many purposes, and will unquestionably eventually find largely increased use at decreased selling prices.

It is always possible to justify almost any kind of industrial operation by assuming a stable price favorable to the operation, and neglecting competitive sources of supply in the analysis. Sound operators, of course, will avoid such assumptions. It is necessary, however, in approaching the economic problem of fixing the importance of raw-material value in relation to this growth, that we keep constantly in mind the current proportions of the industry in relation to the supply of raw material. Complete figures on the sale of solid carbon-dioxide have not been published, but Fig. 1 shows the growth and seasonal fluctuation of the Dry Ice Corporation sales from 1926 through 1930. This represents a large majority of the total volume sold. In presenting this curve, attention is directed to two things: first, the consistency with which the seasonal variation of demand is repeated with its unfavorable sharpness of summer peak; and, secondly, the orderly manner and definite proportion in which the volume of demand increases from year to year.

It would certainly be interesting if it were possible to take a set of curves of this character and predict with great accuracy the volume of sales for years to come. The contention has been advanced by many that this orderly progression in volume of business has been attained in a market stabilized at an admittedly arbitrary introductory price. They contend that, at some lower price level, the selection of which has usually been based upon an idle hypothesis of a hoped-for volume of sales, or on a scale of manufacture unattainable under present conditions, new markets for fabulous quantities of the material will rapidly open. In view of the fact that this type of reasoning is common, and by no

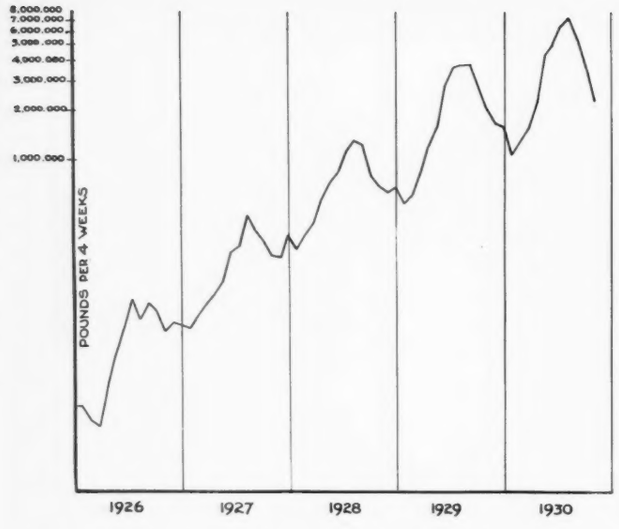



**Fig. 1. Chart showing Dry Ice sales by four-week periods, 1926 to 1930 inclusive.**

means peculiar to solid carbon-dioxide, the point can be passed with little comment.

It must be noted, however, that solid carbon-dioxide has properties widely different from ice. When new users desire to adopt it as a refrigerant they must purchase new equipment for use with it and adapted to it. In many cases they must change their methods. This sometimes involves changes, not only in technological methods, but in selling methods and in the type of market approached when methods of distribution are altered. This is indeed a happy circumstance for a responsible supplier, since the changes described require considerable time for their accomplishment regardless of price, process, or any other consideration. The time lag thus introduced in the development of new business is ample for the construction of any production facilities necessary to meet the demand. The informed manufacturer, quite aside from the current situation in respect to patent control and sales competition, can afford to view with complacence the expansion activities of those less endowed than he with experience in the industry or information as to its rate of sound development.

Notwithstanding this, the properties of solid $CO_2$ combined with the appeal of the catchy and novel trade-mark "Dry Ice", gives news value to Dry Ice. The natural and inevitable consequence of this news value has been a certain amount of editorial comment portraying solid $CO_2$ in general and Dry Ice in particular as a romance of modern business, which perhaps it is. The natural consequence of the editorial comment has been the development of much activity that is more romantic than business-like. However, it is obvious that the rate of increase in the total volume of solid carbon-dioxide marketed bears some reasonable relation to the actual willingness of users to purchase it at a price, and to the rate at which they can possibly adapt equipment and methods for its use. Let us, then, consider a few points in connection with the evaluation of low-pressure pure carbon-dioxide gas.

The chief premise in such a discussion is that carbon-dioxide gas *per se* is absolutely valueless. Like air and water the amount of the supply in some form in every civilized community is far in excess of any conceivable demand. To dwell on this point will be only a waste of time, inasmuch as we must start with all the carbonaceous fuel consumed, add to it all the carbonates calcined, the carbohydrates fermented, and sundry other sources. It will probably be accepted without further support, then, that carbon-dioxide can acquire value only by having something peculiar about it to distinguish it from other less desirable carbon-dioxide in the same vicinity or at least available to supply the same market.

The selection and valuation of by-product carbon-dioxide sources is thus always a competitive question, in that no source anywhere known to us possesses a sufficiently outstanding advantage, against all possible sources for supply of the same market, to have any possible chance of dominating such a market by reason of the nature of the source itself alone. A number of choices are, and always will be, open to any one willing to risk paying anything at all for them. Thus one can find advocates for at least a half-dozen widely varying types of supply for the New York market, and it is perfectly safe to say that there are at least three times as many other sources and processes not now advocated, or at least not receiving publicity, which, under some imaginary set of conditions, could be used to meet

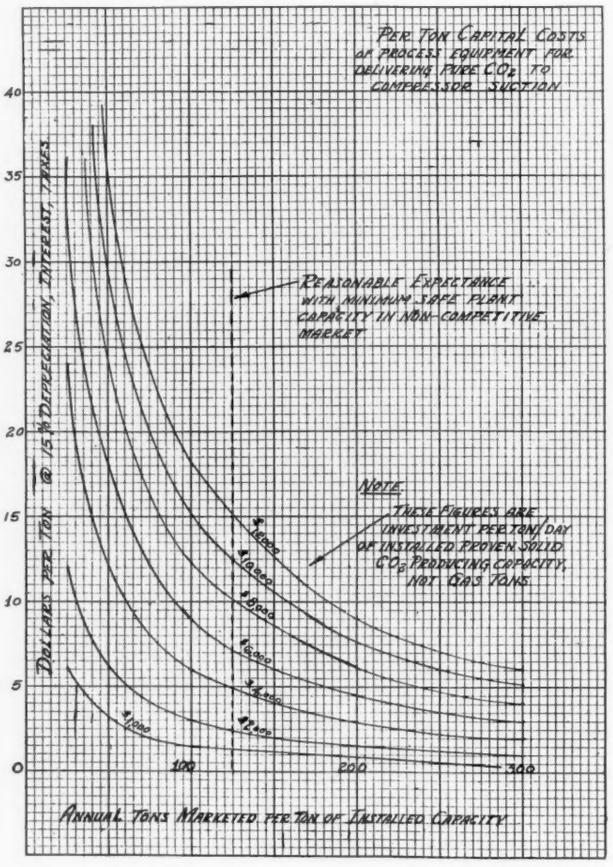
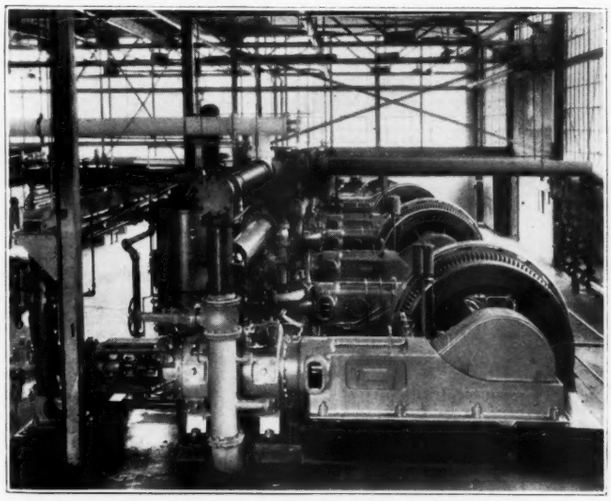



**Fig. 2. Annual-demand curves per ton of installed capacity.**

the demands of the market. Certainly a "corner" on the supply of carbon-dioxide is a practical impossibility and deserves to rank with perpetual motion as axiomatically untrue. This is not a novel pronouncement, and has been recognized by those engaged in the $CO_2$ business for at least a quarter of a century. Raw $CO_2$, in short, bears much the same relation to the Dry Ice business that a supply of air bears to the oxygen business.

Nevertheless by-product carbon-dioxide, under some conditions and in some places, does have value which it may acquire by reason of six factors: (1) purity, (2) pressure, (3) location, (4) seasonal value, (5) safety-factor value, and (6) time value. The net valuation of any source must be based on all six factors and, sometimes, others peculiar to the individual situation. In any event these six factors are additive, and a particularly unfavorable situation in regard to any one of them will often render a given source unattractive, even though the other five are favorable. Conversely, a particularly favorable situation in regard to one factor will sometimes offset unfavorable situations in regard to others.

*Purity.*—Let us then consider purity value first. The ideal in this respect is obviously 100 per cent. carbon-dioxide, *i.e.*, complete freedom from odor, moisture, oil, solids, and gaseous impurities. The criterion of lesser purities is, of course, the cost of correcting the lesser purity to the ideal condition, or to a sufficiently close commercial approach to it. The value involved, however, is purely a relative one, and no absolute value of any kind is implied or is possible for gas of a definite purity. This is because the present or future market is so limited, in relation to enormous available supplies, that only



**Compressor room at Niagara Falls plant, Dry Ice Corp. of America.**

the purest gas available for supplying a given market has any purity value whatever. All other sources for supplying the same market have a negative purity value equivalent to their extra purification costs at the actual existing volume of production and annual load factor. It should be noted that low costs for purification, based on the fanciful assumption of a non-existent annual load factor and volume of demand, are not in question, and any process, regardless of its nature, which requires considerable investment must be scrutinized very closely, particularly if there is any question about the volume of sales that can be realized.

Fig. 2 shows, in convenient form, the arithmetical relation between capital charges, taken conservatively at 15 per cent. for depreciation, interest and taxes, to the annual tons marketed per ton of installed capacity. It is obvious that, except at a very low investment per ton of capacity, capital charges per ton produced mount very sharply at low load factors, and must be still further increased to allow for evaporation losses between the point of production and the consumer. It should be clear that this curve refers only to purity values. The investment shown is, hence, only the investment in process equipment for delivering pure $CO_2$ to the compressor suction, and is entirely aside from the investment in refrigerating machinery and solid-forming equipment. The latter, of course, involve additional investment charges which could be presented in a similar way, but the refrigerating and press investment charges are relatively constant for equal capacity, while the investment in purification equipment is almost nil in favorable by-product locations but becomes quite large if expensive absorption systems are employed.

Just what constitutes a reasonable expectance of sales from a given plant capacity is, of course, not germane to this paper, nor is the bearing of patent control and effective sales-promotion method of interest in a purely economic discussion of this kind. However, it will be apparent from a casual inspection of the annual demand curves presented in Fig. 2 that the indicated figure of 125 tons per ton of installed capacity as a reasonable expectance for actual production in a wholly non-competitive field, is a fair maximum. Some recent plants have produced as little as 30 to 50 annual tons per ton of installed capacity in strictly non-competitive markets. As a matter of fact, 125 tons per ton of capacity in plants of economical size is now attainable in only a few large cities. Summing up this point, the purity value depends upon purity relative to the most attractive source for supplying the same market, corrected for differences in purification cost on the basis of actual volumes produced.

*Pressure.*—A few sources of carbon-dioxide acquire a definite value by reason of their pressure, but, here again, value can be based only on some conception of relative desirability. Gas wells yielding $CO_2$ under substantial pressure are generally in such remote locations that their operation could probably be made to pay only on the basis of large-volume production that would support efficient manufacture with low overhead charges at the point of production, and shipment in quantities large enough to bring the transportation cost within reason. These conditions do not exist, but, for the above reason, a positive value of pressure *per se* in its influence on by-product value can exist only in relation to a plant where the volume produced is far beyond present proportions.

At the Niagara Falls plant of the Dry Ice Corp.

of America the maximum amount of Dry Ice produced per kw.-hr. has been 13 lb., while under the fluctuating operation the year-round average has been 8.7 lb. per kw.-hr., and the average cost of power approximately $1.00 per ton. Depreciation, fixed charges, and maintenance on the compression equipment amounted to $1.40 per ton.

From this we might conclude that the value of pressure in any case is not large in relation to existing selling prices, but such a conclusion would not begin to express the facts as they are. Our conclusion must be modified by the fact that, in every geographical district where carbon-dioxide issues from the ground under pressure, there are many wells producing the gas under diverse ownership. This means, in simple language, that, even if a positive pressure value could be assigned to a given source of gas, it would be negatived by the willingness of another well owner or driller to consider something less as sufficient to cover the value of this particular item. From this point of view, any credit whatever for pressure value must be dropped out of consideration in a competitive cost analysis. The common occurrence of carbon-dioxide gas wells in petroleum-producing regions of certain types leads to the thought that future drilling for oil and gas over a period of years is quite likely to confirm the view that control of known well-gas supplies is unimportant.

*Location.*—Location value is perhaps the most important consideration generating value for by-product carbon-dioxide. By the same token it is perhaps the most difficult to appraise correctly. Here again we are faced with the problem involving constantly changing premises, and the locations which appear to have the greatest location value, for, say, the next five years, are by no means necessarily the same locations that might have the greatest ultimate value.

If we set up the idle hypothesis that the market for vast quantities of solid carbon-dioxide is a likelihood of the near future, and that this market will be distributed approximately in proportion to population, we must immediately come to the conclusion that the only desirable locations are those at or near the points of use, which are the larger centers of population. However, such a supposition is far from the facts and, for the time being, no market exists in any single center of population—not excluding the metropolitan area of New York City—sufficient to support, by the demands of the local trade alone, a producing plant of economical proportions, manufacturing, say, 100 tons per day.

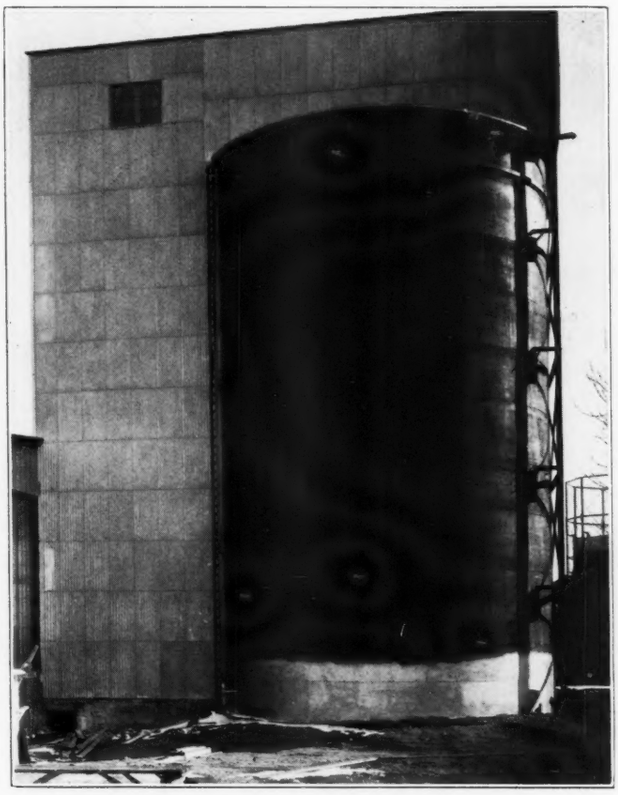
It is rather obvious elementary economics to state that a dilemma is then presented; namely, that of manufacturing on a costly scale at the point of consumption, or manufacturing on an economical scale away from the point of consumption and spending part or all of the saving for the transportation of the product. No final and clear choice in this dilemma is ever possible, since both types of operation seem to have a definite application, and each may seem better suited to definite local situations. However, considering for a moment only sources of by-product carbon-dioxide in which the owners of the by-product $CO_2$ are anxious to dispose of substantial tonnages of their waste product, only the second theory is possible. Distribution to a fairly wide area is necessary and apparently will be necessary for some time to come. This injects into our conception of location value the conception of center of gravity of surrounding markets, and will perhaps be sufficient explanation of the fact that the largest producing unit now operated is located at Niagara Falls. In addition to questions of power, water cost, and other favorable factors, the ability to ship with a reasonable average-length haul to more of the northeast part of the United States than is possible from seaboard points was an important consideration. Likewise the location of the largest producing unit in the midwest at Peoria, insofar as transportation is concerned, was dictated by similar considerations. To state the point briefly, a central location, a reasonably short distance from a number of markets, quite obviously has greater "location value" than either a more remote point on one hand, or a point located in one market, but not easily accessible to surrounding markets, on the other hand, particularly when the market at a single center of population is not large enough to support a plant of economical size.

*Seasonal Value.*—By-product sources may also acquire value by reason of their seasonal nature. Thus, a source which produces heavily during the summer months and little or nothing in the autumn and winter months has an obvious advantage in supplying a seasonal industry with corresponding peaks. Such seasonal operation is particularly desirable where no penalty attaches to complete shutdown in the winter months when the solid carbon-dioxide business temporarily approaches absolute zero.

*Safety Factors.*—Specific sources also acquire value by reason of the safety factors involved. Thus, a source protected by two or three purification systems, maintained and operated for other purposes and not charged against carbon-dioxide production, obviously carries greater assurance of satisfactory quality than one in which such purification operations are absent. A fair example to illustrate this point may be taken from the Peoria plant of the Dry Ice Corp., for lack of a better one. Here gas produced by fermentation is first passed through an absorption system, the primary purpose of which is the recovery of volatile solvents, and the costs of which are borne by the solvents recovered. There is at the same time, of course, a purification of the gases from odor which is purely incidental. The gas is next passed through a water-absorption system, whose primary purpose is the production of other products and which has been operated for several years quite without regard to the recovery or sale of carbon-dioxide. A third purification system is employed to clean up any remaining traces of odor, while a fourth system is used for the removal of permanent gases. It should be obvious that this gas has some appreciable value, some desirability over a hypothetical source similar in every other respect but not so well protected

from the hazard, ever present with any system, of occasional small quantities of unsatisfactory quality material.

Further comprehended in the term "safety-factor value" is the implication of assured con-



**Regenerator with capacity of 4,000 tons of solid carbon dioxide.**

tinuity of supply. Thus, a by-product $CO_2$ plant, whose output of primary product is sold entirely through very conservative channels and whose operation has been at a constant rate over a period of years, is obviously more desirable than the source of which these things can not truthfully be said. The measure of this desirability is, of course, a value due to this factor. Further assurance of continuity of supply is obtained when the proportion of solid-producing capacity to total carbon-dioxide available is quite small, since it will then require a substantially complete shut-down of the parent plant to influence materially the operation of the solid-carbon-dioxide plant.

*Time.*—This consideration would be incomplete if some mention were not made of time value. In the expression "time value" is comprehended a concept of the valuation based on all the other factors of any kind being timely in relation to the actual state of development of the market for the product. Thus, no positive value whatever can be assigned to by-product carbon-dioxide under any circumstances, unless there is believed to be a profit obtainable from its recovery. Such a profit presumes that operations are undertaken at such a time that the increased amounts of solid carbon-dioxide produced are made available to the market at approximately the same time, and in approximately the amounts that can be absorbed, or perhaps a little faster to allow for unforeseen conditions. Much progress has been made in this direction in the past few years by the reduction of the time necessary to provide additional producing capacity, but there is still a naïve tendency on the part of seasoned engineers, studying by-product $CO_2$ in particular and DryIce in general, to base conclusions on the unwarranted assumption that the product manufactured can be sold without difficulty at some price necessary to yield a profit in their own mind's eye and that the market is in no danger of over-supply and its usual train of economic consequence.

In one example of rapid construction the ground was broken for the plant on April 10, 1930, and a producing unit of 50 tons' capacity was placed in operation on July 17, producing at once steady and dependable quantities of salable product. In many instances it is now possible to forecast accurately the rate of market development at least four months in advance by following closely the progress of the principal users and prospective users in modifying their equipment and methods. A change, for example, in refrigerated truck transportation of any large hauler of meat or frozen products requires some months for its accomplishment.

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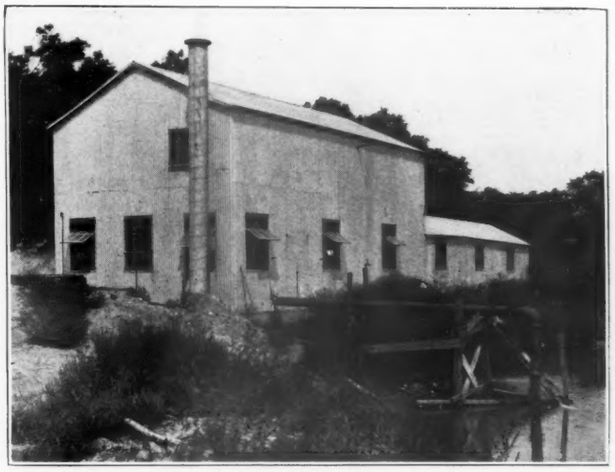
## Cost Records Justify New Plant

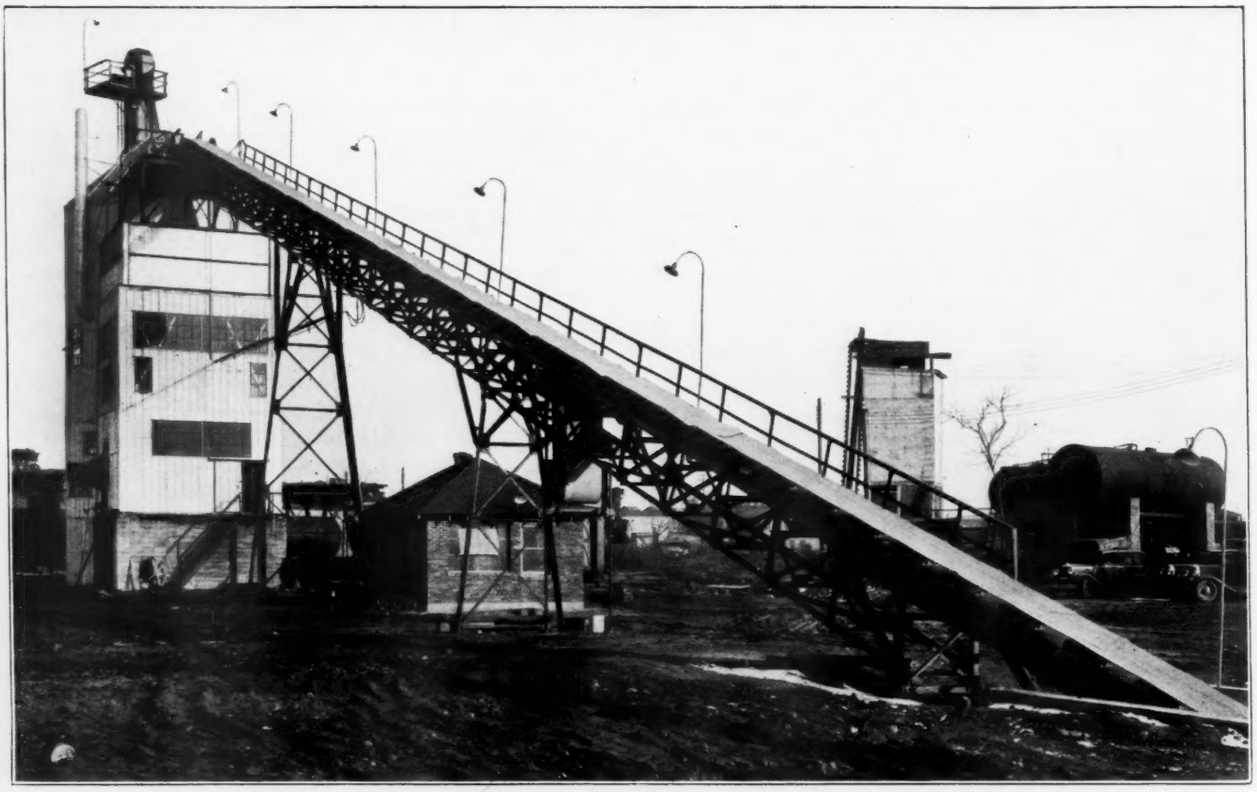
*(Continued from page 39)*

The office of the Highland Sand & Gravel Co. is at 270 Baker St., West Roxbury, a short distance from the plant at Newton. At the same location is the plant of the Simbroco Stone Co., where artificial stone products are made. This company is



**The power plant in which are housed the Diesel generating unit, the air compressor and the water pump.**

owned by the same interests and is supplied with aggregates from the plant at Newton. Officers of the Highland company are Geo. S. Wilbur, president; and A. C. West, treasurer and general superintendent. Mr. West designed the Newton plant. Thomas McCormick, foreman, was in charge of its construction.



Plant view showing aggregates conveyor and the office building.

# Louisville Ready-Mixed-Concrete Plant Constructed for Permanence

## Six-Compartment Cement Bin Employed to Meet Demand for Different Brands

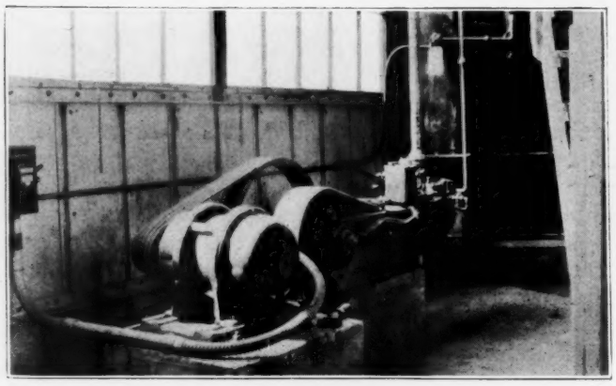
By MAT F. BEISBER

KEEPING abreast with the times, the city of Louisville, Ky., prides itself in having one of the finest ready-mixed concrete plants built anywhere. Louisville, well over 300,000 in population, has long been a center of the construction industry for the southern Indiana-Kentucky region and is an excellent location for a large plant. Numerous river-gravel plants have their terminals and loading docks along the Ohio River banks at Louisville. Several of these are nationally known.

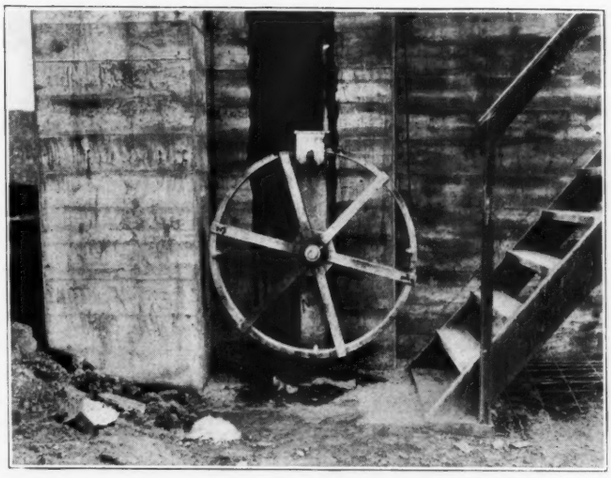
Although not the first to enter the ready-mixed concrete field in this territory, the American Builders Supply Co. was the first company to gauge the potential market and to build a plant of proportionate size. Briefly, the plant comprises complete aggregate and cement storage and batching equipment designed for a 3-cu. yd. batch, a mixer, and a fleet of agitator-type delivery trucks.

Such problems as the heating of aggregates, hot-water supply, prevention of cement arching and clogging in the bins and screw conveyors have been handled in ways that are rather new to the industry. These, with excellent design of the entire plant, make it a model installation. The latest and best equipment was chosen. Without the delivery equipment, the investment was $75,000.

The company has been in business six years, furnishing building materials to the Louisville market, and its entry into the ready-mix field comes as a natural expansion. A. A. Fischer is president,



Compressor and multiple V-belt drive.



Monitor-spout control wheel for diverting aggregates to respective bins.

Henry Bickel, a well-known contractor, and K. A. Barker are vice-presidents, and J. F. McCracken is general manager.

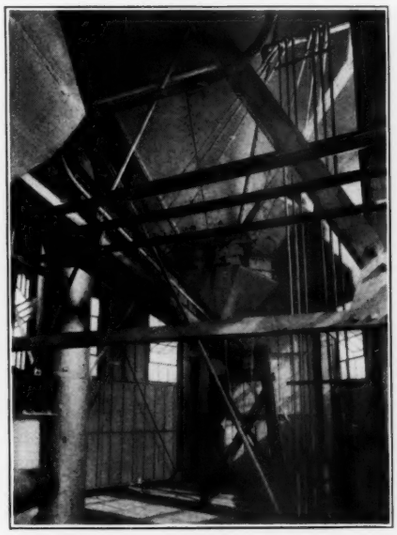
The plant enjoys an enviable location leased from the American Barge Co., on its wharf along the Ohio River. Adjacent to it, on both sides, are aggregate-storage terminals—the Nugent Sand Co. on the east and the Ohio River Sand Co. on the west. These firms, with the E. T. Slider Co., furnish the bulk of the aggregate materials. Sufficient land, however, is available for the construction of the company's own aggregate plant and terminal, should this become desirable. Not only is this location unusual from the materials-source point of view, but it is within walking distance of the downtown business district of Louisville.

Approaching the plant the observer notices two adjoining steel-enclosed buildings, the taller resembling a tower. A steel conveyor structure extends from the ground to the mixer building. Beneath the conveyor a neat brick building accommodates the plant office and scale house. The neatness of the steel-inclosed hoppers and the steel conveyor structure alone makes this plant outstanding. The absence of wooden conveyor undercarriage construction places it far above the average.

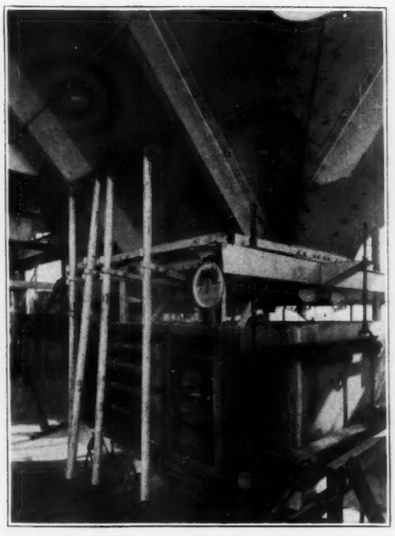
As stated, aggregates are purchased from adjoining producers. Delivery to the plant is by trucks which dump into a steel hopper 10-ft. square, at ground level in a reinforced concrete sump, the walls of which project above the ground to act as a truck back-stop. The sump is 15 ft. in depth and houses the hopper with the tail pulley of the plant conveyor. A radial-type dumping gate feeds the aggregates to the 30-in. belt conveyor which extends to a monitor spout above the aggregate bins. Provision has been made in the sump floor for the installation of a small sump pump to remove rain and seepage water.

The Stephens-Adamson Co. of Aurora, Ill., designed and built the entire conveyor structure, feeder-hopper and the cement-handling power shovel and elevator. The aggregates conveyor is approximately 225-ft. on centers and rests upon a steel undercarriage heavily braced throughout. Stephens-Adamson Timken-bearing idlers and return rolls with Saco belting are employed, the unit being driven by a General Electric 25-hp. motor. This conveyor can handle 240 tons of material per hour. A walkway with a steel railing provides access to the top of the bin structure. Six conduit electric-lamp standards add to the safety of the structure.

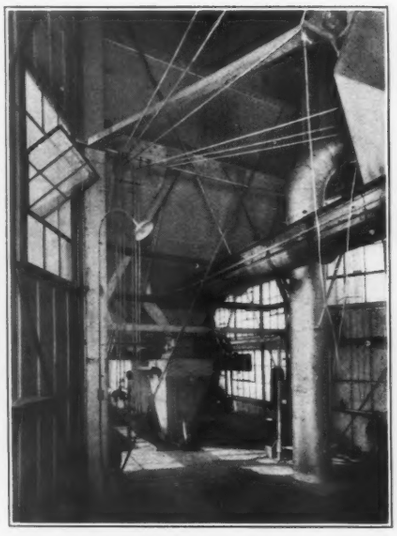
As four sizes of aggregates are stored in the Butler aggregate bin, a monitor spout has been installed beneath the head pulley of the conveyor. This spout can be revolved to discharge into any compartment. A bull-wheel is encircled by a ½-in. wire rope which extends on idlers down to the ground-level where a handwheel controls the positions. Four numbers are marked on the wheel to indicate the position of the spout. When a different grade of material is brought to the plant, the operator need only manipulate the handwheel to properly direct the material to its bin. The cement and aggregate hoppers and the complete batching



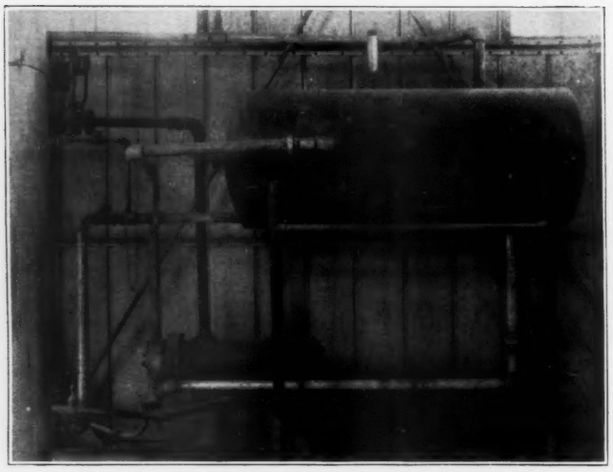
Cement hopper, compartment valves, and screw conveyor.



Aggregate hopper above the weigh-batching equipment.



Screw conveyor loading to the cement weighing hopper.



Water-heating equipment and tank.

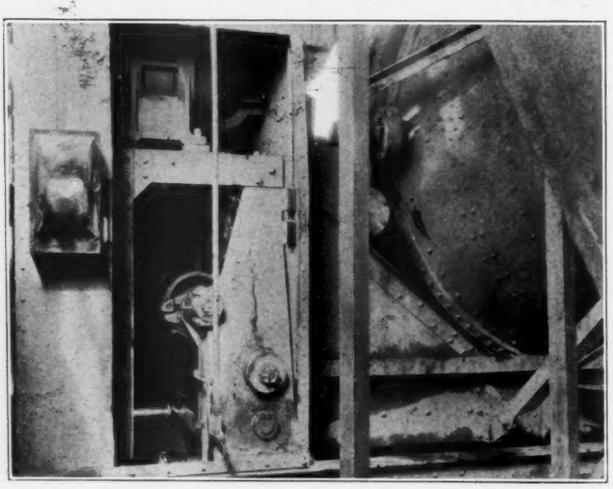
equipment were furnished by the Butler Bin Co. of Waukesha, Wis.

The aggregate bin has a total capacity of 215 cu. yd. for its four compartments. Two grades of sand —coarse and fine—and two sizes of gravel are stored normally. Beneath the hopper are located successively the batching floor and the mixing floor. The structure rests on massive concrete foundations which, in turn, are supported by wooden piles.

The cement-storage building is adjacent to the aggregate-storage building. Because of its hexagonal shape and peaked roof it appears much like a tower. This building houses the six-compartment cement bin above; the water-heating apparatus at the level of the batching floor in the aggregate-storage building; and, on its ground level, the steam boiler and air compressor. A full carload of cement can be stored in each of six compartments.

Cement arrives at the plant in bulk carload quantities over a Louisville & Nashville R. R. siding. Unloading is accomplished through the use of a Stephens-Adamson automatic power shovel which moves the cement directly into the movable hopper of a belt-bucket elevator which leads to the top of the cement storage bin. This apron extends to the car-door from the boot of the elevator.

The elevator, which is approximately 85 ft. high and can handle 40 cu. yd. per hour, also discharges through a monitor spout above the cement bin compartments. A hand-wheel control for it is located on the ground level inside the structure. The elevator is driven by a 15-hp. motor and the power shovel by a 5-hp. motor.



Inclosed motor and drive at the mixer.

The six compartments were provided to store various cements to meet contractors' specifications. The compartments all terminate at a point over the batching-floor level. Six Fuller-Kinyon valves control the flow of cement into a hopper which, in turn, feeds a 25-ft. screw conveyor leading to the cement batcher. A 5-hp. motor, driving a Caldwell worm-gear, operates the screw at a speed of 68 r.p.m.

The cement, having a tendency to arch in the bins and to pack in the screw conveyor, is often the cause of difficulty and interruption in ready-mixed plant operations. Compressed air solves this problem at the American Builders Supply Co. plant. Into each of the cement compartments just above the Fuller-Kinyon valve, a small air jet with a check valve has been installed. Each of these jets is fed

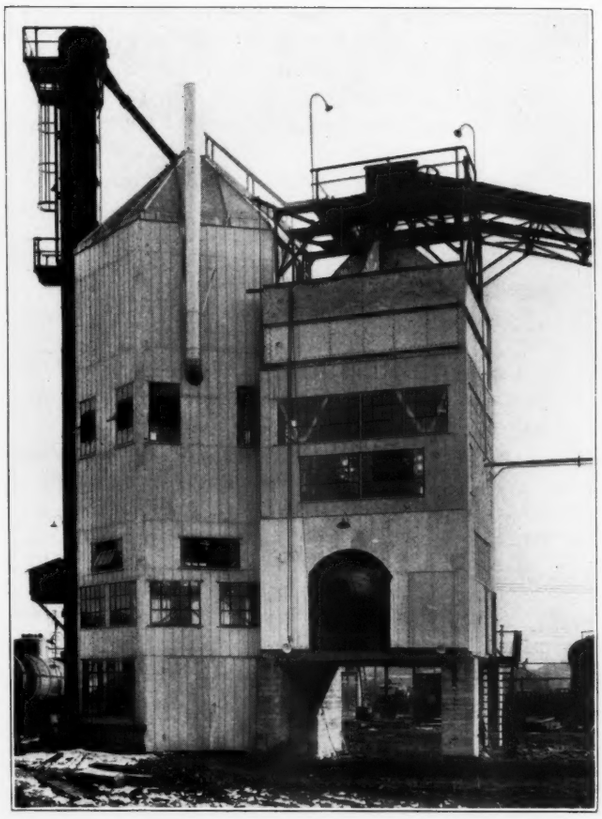
The mixer-control apparatus. Batch meter at left.

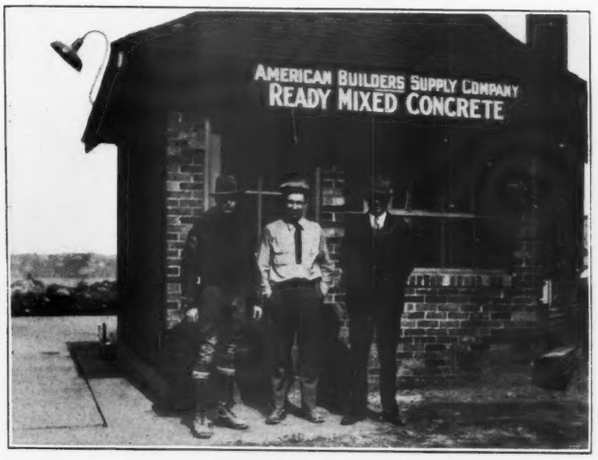
by a $\frac{3}{8}$-in. pipe from a center pipe which extends from the pressure tank on the ground level. Additional jets have been installed in the shell of the screw conveyor for the same purpose. Whenever an interruption in the flow of cement occurs, the valve for the compartment in use is opened and the arch is broken immediately. A Reed air filter in the main compressed-air line removes all moisture. The compressor is an Ingersoll-Rand 5-in. by 5-in., electric-driven by a General Electric $7\frac{1}{2}$-hp. motor with Allis-Chalmers Texrope drive. The unit is automatically controlled by a pressure switch.

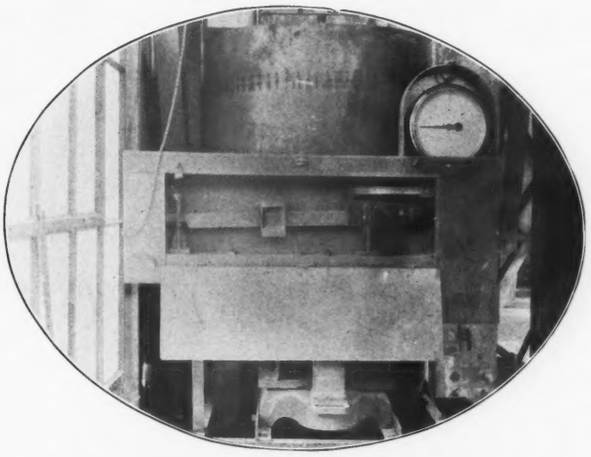
The batching equipment comprises a Butler 3-cu. yd. hopper for weighing the aggregate, a four-beam scale (one beam for each material), and a tell-tale dial. Directly in front of the scale are control levers for operating the aggregate bin gates.

Both weighing hoppers discharge to a common spout which passes through the floor to the mixer. The chute is designed for three-way spouting, one way providing for an additional mixer, one for possible dry-batch truck shipments, and the third entering the present mixer directly.

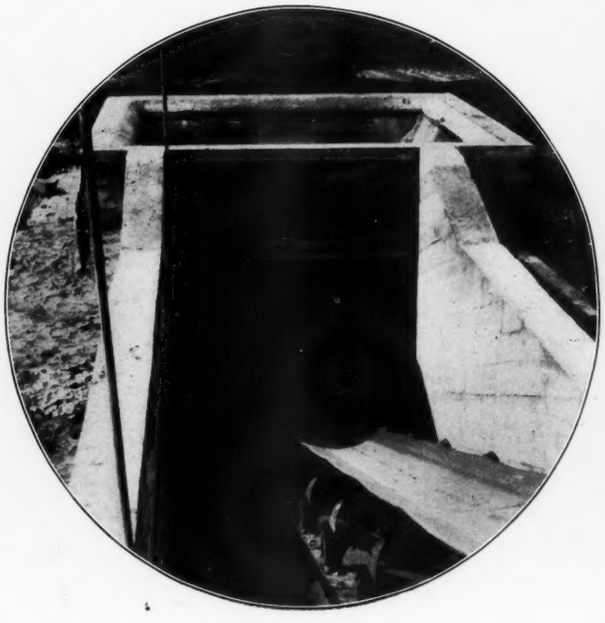
A platform scale and a cylindrical tank for water weighing were furnished by the T. L. Smith Co.,

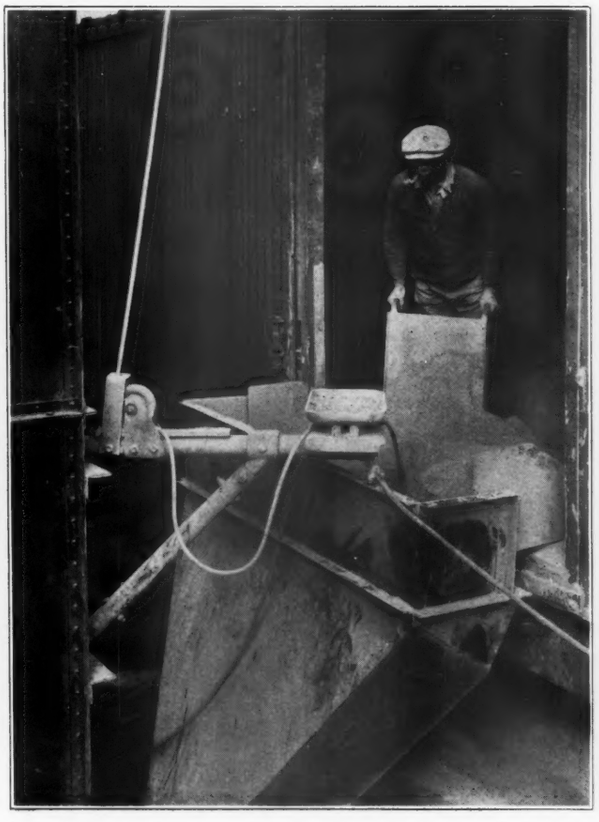




*Above*—View of plant from mixer-discharge side. *Below*—Hopper over belt conveyor for receiving aggregates by dump truck. *Right, reading down*—G. C. Cook, superintendent, Robert Norton, engineer, and L. K. Miller, clerk, at the office and scale-house. Weighing device used to measure the mixing water. Hoist-operated shovel, which unloads bulk cement to the receiving hopper, being guided by operator.





**Delivery truck spotted below the mixer.**

Milwaukee, Wis. The tank is 34 in. in diam. and 42 in. high, and has two large diaphragm valves in its bottom for quick discharge of the water. A quick-opening valve permits its rapid filling. The scale is a Fairbanks 1000-lb.-capacity platform type.

The T. L. Smith Co. 3-cu. yd. electric-driven mixer is driven by a 50-hp. motor which, with its gear-drive mechanism, is inclosed in a steel cabinet for dust-proofing and safety. The mixing is controlled from the batching floor, a Koehring Batchmeter timing it automatically.

Five Blaw-Knox agitator-type bodies are used for delivering the concrete. All these bodies are mounted on Mack 3½-ton trucks.

Wintry operation which involves the heating of the aggregates and the water is in accordance with the latest plumbing-and-heating practices. Steam is generated in a Lookout Boiler & Mfg. Co. 100-hp. vertical boiler on the ground floor of the cement-hopper building, a pressure of 80 to 90 lb. being maintained. The steam is piped to a series of pipe coils located within the aggregate hopper. These coils, made up of 2-in. pipes, are mounted along the compartment partitions and on the interior of the bin walls. Each coil is trapped and the condensate is returned to the boiler to prevent the addition of moisture to the aggregates. Also, the return of the condensate insures a long life to the boiler.

For heating the water supply, the system is similar to that used in apartment buildings. A Patterson-Kelley cast-iron shell heater and a 220-gal. storage tank are employed, the temperature of the water being maintained automatically. A sylphon valve is installed in the steam line. This heater consists of copper U-tubes through which the water flows, the steam coming in contact with the outside of the tubes.

Of especial interest is the excellent installation of electric motor-control apparatus. A Westinghouse main-line safety switch, located in the office building, cuts off the power supply to the entire plant. On the batching floor, a control board is located with Westinghouse safety switches for the various plant motors. Here the mixer starting-box is located, as well as the conveyor-motor starter, all within easy reach of the operator. General Electric starters are standard for all motors.

A Fairbanks truck-weighing scale with a 40,000-lb. capacity is built into the scale building. All arriving trucks with aggregate loads are weighed in before the materials are accepted.

For correct control of batch weights, design of special concrete, and other technical service, the company has engaged the service of the E. A. Hagey Co. of Cincinnati, O., consulting engineers. This firm is represented at the plant by Robert Norton. G. C. Cook is plant superintendent.

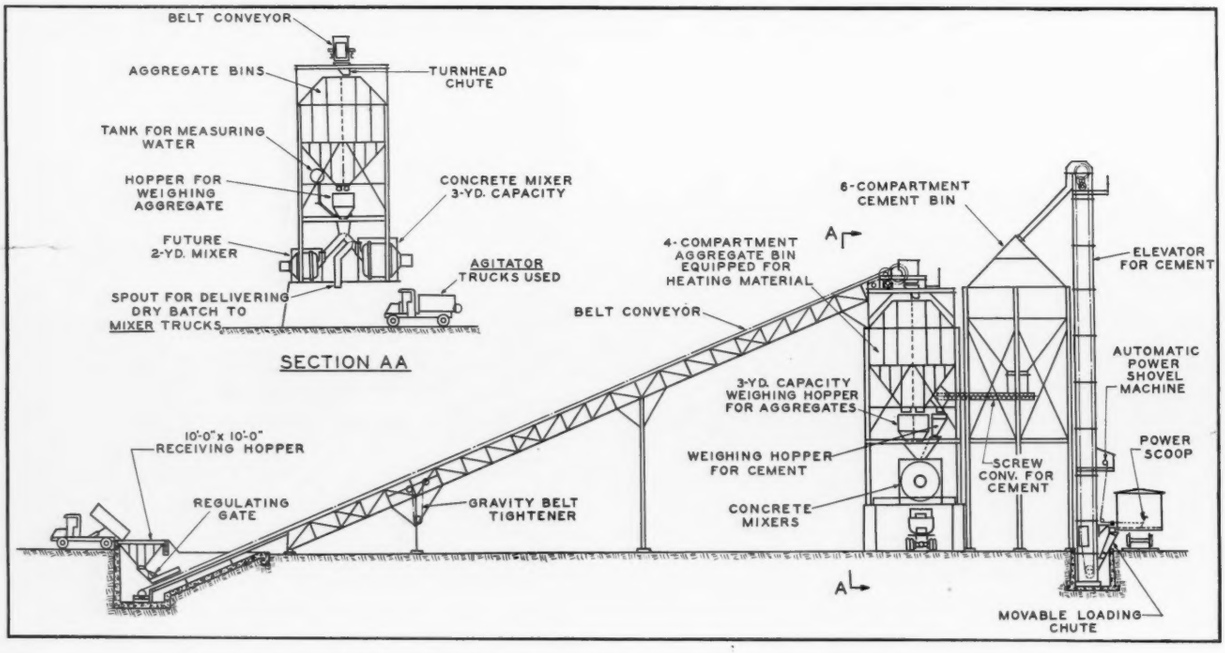



**Diagram of materials-handling and mixing-plant operations of American Builders Supply Co.**

# Quarry Workers in St. Louis Area Take Course in First-Aid to Injured

By E. J. McMAHON
*Secretary, St. Louis Quarrymen's Assn.*

A RECENT visitor to the St. Louis quarries might have suspected a most unusual series of catastrophes. Here, several men with broken arms—there, a number of fractured skulls —further on, a group of cracked ribs—and, again, a few broken backs to complete the picture. This was duplicated, not once or twice, for nine different quarries in and about St. Louis seemed to be similarly afflicted, simultaneously.

However, no particular hades had broken loose: it was merely a first-aid campaign put on by the St. Louis Quarrymen's Assn. under the supervision of the U. S. Bureau of Mines. Such campaigns no longer rank as novelties, but it is believed that this is the first time the quarry industry has attempted this work on such a wholesale scale, especially as several of the plants expect to train 100 per cent. of their employees, and so qualify for the 100-per cent. Plant Certificate given by the Bureau of Mines.

The Bureau of Mines has been doing everything possible for years, first to lessen accidents in mines, quarries and allied industries and, second, to teach the proper treatment and handling of men wounded when accidents do occur. A decentralization policy has been found best adapted for this purpose. Regional headquarters are maintained in several localities, usually centered in a mining district.

Assigned to each office is a special headquarters railroad car, combining office and apparatus rooms, sleeping, dining and kitchen sections, and manned ordinarily by two instructors and a cook. These cars being primarily intended for mine-rescue purposes, they are rushed to the scene of any catastrophe and the teams lead in the rescue work upon arrival. But, ordinarily, cars and crews are available upon request to the allied industries, for instruction in first-aid and accident-prevention organization and work.

At the recent National Crushed Stone Assn. convention in St. Louis, the Bureau of Mines had its usual exhibit and, as usual, Messrs. Adams, Munsch and Thoenen who were in attendance, volunteered the Bureau's services to any quarry company requesting it. It happened that the St. Louis Quarrymen's Assn. had been studying accident prevention.

Aid to jaw injuries as demonstrated by the Tower Grove quarry class.

The presence in the city of these visiting officials facilitated matters so much that arrangements were shortly completed for the collective training of all employees of several local quarries.

Handled very promptly, first by D. Harrington, chief engineer, Safety Division, Washington, D. C.,

Tourniquet, hand bandage and sling application by the class from Eyermann's Grand Ave. quarry.

The Union Quarry Co. class after an instructive demonstration in first-aid to arterial bleeding.

Rock Hill Quarry Co. class assembled at the Bureau of Mines demonstration car.

The class from the Union Quarry Co. shows how to apply splints to broken backs.

then by C. A. Herbert, supervising engineer, Vincennes, Ind., a headquarters car was spotted on Rock Hill Quarry tracks, March 15, with E. E. Quenon in charge.

Nine quarries participated in the campaign, seven turning out every man for the lessons and two sending their foremen only. Five classes were held in different parts of the city and county from 3 to 5 o'clock, Monday to Friday inclusive. Each class had one instruction period of two hours per week, repeated for five weeks. The companies wisely decided the course was of such value that all men should take it. Therefore attendance was made compulsory and the men were paid full time while attending.

Eyermann's Virginia Ave. quarry class demonstrates binding of fractured arms.

The training course has been condensed until nothing but meat remains, and the instructors, doing this work week after week, become so proficient that they get large results quickly.

Only four main phases of first aid are taken up: control of bleeding, shock, artificial respiration, and transportation of the wounded. Instruction is given as to what should be done and when, where and how. Negatively, all are cautioned against the things that should not be done or attempted. The course is eminently practical, the men being first told how to do things, then shown how to do them, and finally required to apply the bandages, tourniquets and splints to delegated "victims." A surprising confidence and skill is acquired after only one or two lessons, as was proved in a case of arterial bleeding in a home accident being stopped after only one lesson.

The chief result is that these quarries are able to give immediate and satisfactory attention to their wounded. The typical St. Louis quarry being a pit 200 to 250 ft. deep, the difficulty and the time required to handle an injured man to the surface is easily realized, so the time gained in treating wounds is always an important and vital factor.

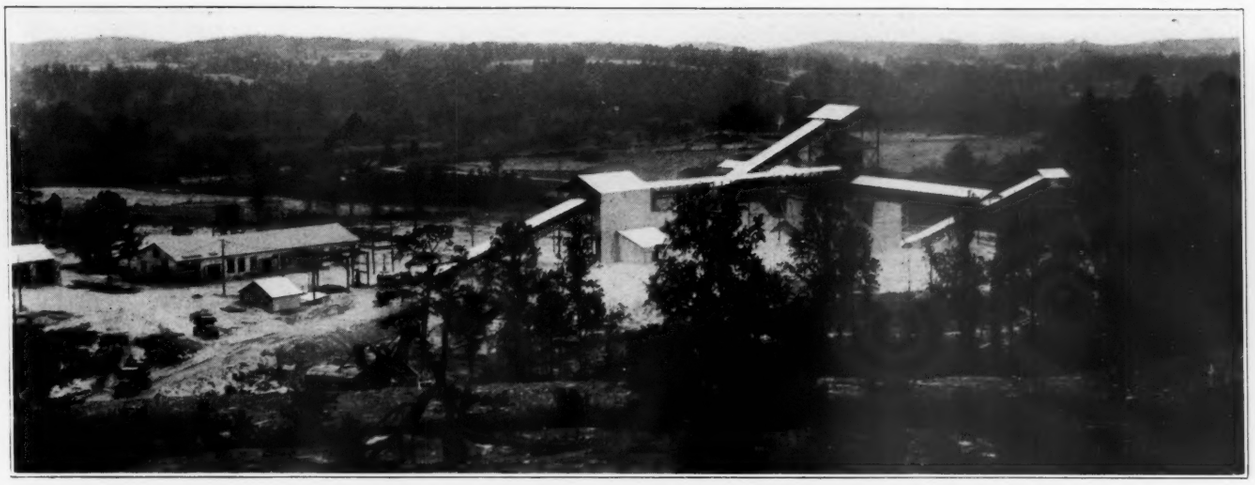
Second, the course brought home to all men who attended the fact that these injuries are not only painful and costly, but that they are largely unnecessary. Before the course was half over, a joint meeting of all superintendents and foremen was called to discuss accident prevention. At this meeting, steps were taken to start a safety organization at each plant, and the enthusiasm gave promise of real effort and real results.

It is estimated that the course cost the Bureau of Mines approximately one thousand dollars (being given gratis, however, to the quarries) and cost the St. Louis operators about two thousand dollars; but an annual dividend of twice this amount seems not only possible but probable.

## California Produces New Type of a Light-weight Aggregate

Globulite is a coined name that Knox Harding, Los Angeles, Cal., has applied to a light-weight, artificial aggregate. He is the inventor of a process for making this material from clay. In using his process, ordinary brick clay is mixed with a small amount of granular carbonaceous material and the mixture is extruded through a multiple die as many round pugs. These pugs are sliced, seventeen times per second, into thousands of small damp billets which pass through a device in which they are rolled into balls and coated with refractory material such as fireclay.

These small balls next enter a 6-ft. by 62-ft. rotary kiln and proceed in a rolling, stirring stream about one foot deep. The maximum temperature in the kiln is sufficient to fuse the clayey material but is below the fusion point for the coating material. The interior puffs until each ball becomes four to seven times its original volume. The burning treatment requires 21 minutes.



Looking down on the plant from the side of Rock Chapel Mountain. Shovel and trucks in foreground.

# Mountain of Granite in Georgia Yields Aggregate of Great Strength

## Twelve Tons of Dynamite are Required to Loosen 80,000 Tons in Recent Blast

THE crushed-granite plant of the Consolidated Quarries Corp. at Lithonia, Ga., when it was built in 1929, was regarded as the most modern plant in the Southeast. A complete description of this plant was published in the May 8, 1929, issue of PIT AND QUARRY, shortly after it went into operation. Since that time a number of interesting changes have been made which are described in this article. None of these changes, however, affects the original design of the plant, which remains the same after more than two years of operation.

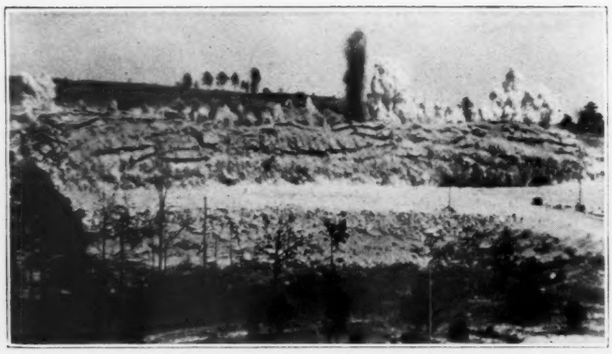
The deposit from which this plant secures its material is a huge outcrop of granite known as Rock Chapel Mountain. This is about 115 acres in extent and, at its peak, is more than 150 ft. higher than the surrounding country. It is estimated that there are more than 24,000,000 tons of rock above the ground level. The depth of the deposit is unknown, but it has been drilled to a depth of 200 ft. at the edge of the mountain. This deposit is ten miles southeast of the famous Stone Mountain, which is a similar but larger formation. The stone is a light gray granite with a crushing strength of 20,000 lb. per sq. in. and other qualities in a corresponding degree.

As the slope of the mountain-side is about 20 deg. the opening shots in this quarry were practically bottom shots. Tripod air drills were used until the face had been worked back into the mountain far enough to reach a height of over 20 ft. Since that time a Sanderson-Cyclone well drill, with a 5⅝-in. bit and driven by a 15-hp. electric motor, has been used for drilling.

A blast made in this quarry on March 16, 1931, brought down 80,000 tons of granite and is conceded to have been one of the largest ever made in Georgia. It was a single-row bank shot of 42 holes loaded with 24,000 lb. of Du Pont Gelex A dynamite. The holes were spaced 18 ft. apart, with a burden

One end of Rock Chapel Mountain showing an abandoned dimension-stone quarry.

A view of the quarry face shortly before the recent blast was made.



An unusually good blast picture showing the bank just as it began to roll.

The same quarry face after the blast. Note lack of stratification of deposit.

of 20 ft., and averaged 70 ft. in depth. More than 3,000 ft. of Cordeau double-countered fuse was used in the holes and 800 ft. of plain Cordeau fuse was used for connecting the holes. It is evident from the accompanying photographs that the breakage was good.

As described in the original article, secondary drilling is done with Ingersoll-Rand Type S-49 Jackhamers. A Bucyrus 100B electric shovel with crawler traction and a 2½-cu. yd. dipper loads the stone into trucks which haul it to the primary crusher. Autocar 7½-ton trucks with 6-cu. yd. Easton Phoenix-type sidedump bodies are used.

Another improvement of importance is the new granite-block roadway which is being built for the quarry trucks. Three motor trucks haul the blasted rock to a primary crusher, using a roadbed of screenings on the quarry floor. Several stone-cutters, borrowed from one of the dimension-stone quarries nearby, cut 5-in. by 5-in. by 10-in. paving blocks from the native granite in the company's quarry. These blocks will form a permanent, durable highway and should greatly reduce the operating cost of the trucks.

The plant is built of concrete and steel throughout and is of the most advanced type. All handling of materials is done by belt conveyors. The screening-and-storage building is the most interesting part of the plant. Sized aggregates are stored in bins or stock-piles by distributing belt conveyors. These materials are reclaimed by means of a tunnel-conveyor system. A Garst ⅝-cu. yd. power scraper operated by means of a Gardner-Denver 2-drum 15-hp. portable hoist has been added recently to assist in the disposal of overstocked materials. It also serves to drag materials from exterior stock-piles back into the main stock-piles. Large piles of materials can be built with this unit, thus increasing the ground-storage capacity.

A new Tyler Hum-mer 4-ft. by 7-ft. vibrating screen has been installed in the car-loading building. All materials from the tunnel-conveyor pass directly onto this vibrating screen, where a heavy spray of water removes the dust. The washed materials then fall to a reciprocating spreader, which spreads the material laterally in the cars in even strokes to prevent segregation. Water is supplied by an Allis-Chalmers 6-in. centrifugal pump from a pond which was formed by damming a stream during the construction of a railroad trestle which carries a sidetrack to the plant. The trestle was built of timbers and was later filled with granite screenings, the latter forming a compact mass 30 ft. high which proves an excellent dam.

## Chilean Government Forbids Use of Foreign Cement in Public Works

The Chilean government recently issued a decree making obligatory the use of Chilean-made cement in all government or municipal construction work. The reasons for this action, as set forth in the decree, are: that the national industry may be protected and promoted; that the quality of Chilean cement is equal to the imported; that the national companies have agreed not only to refrain from increasing the price, but to reduce the sale price as much as possible; that the productive capacity of national plants is sufficient to supply the quantity and quality of the domestic demand; and that the annual expenditure of 25,000,000 pesos (about $3,000,000) for foreign cement may be curtailed.

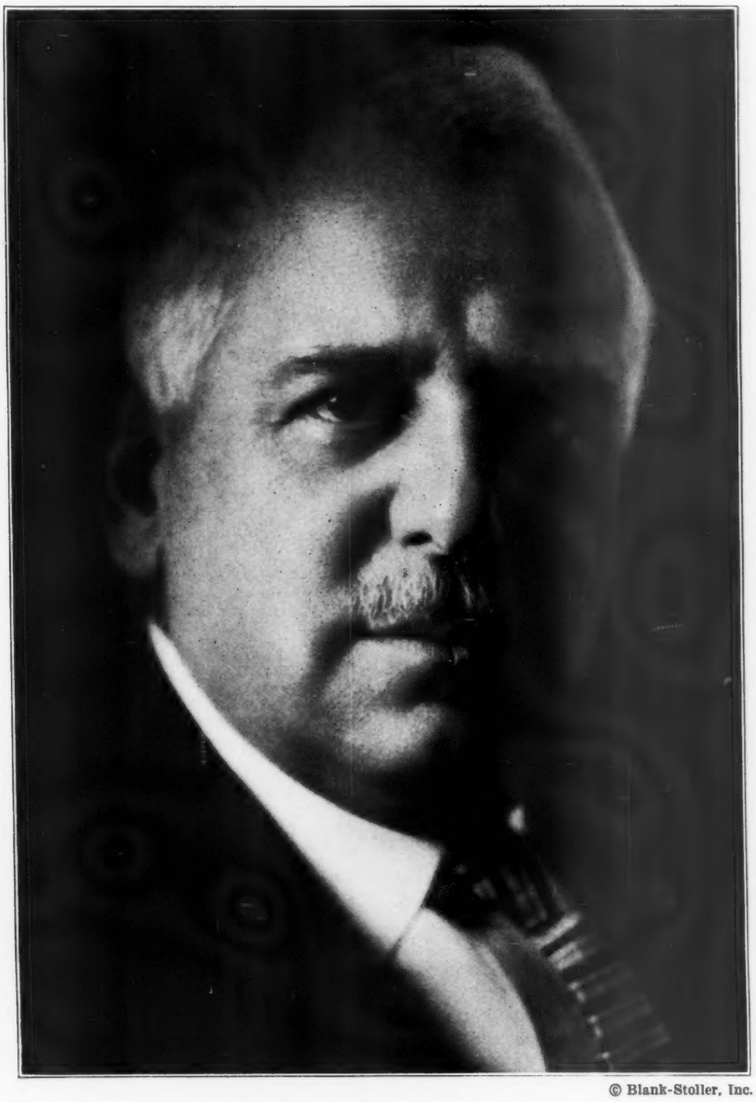
The screening-and-storage building with the new scraper stock-piling unit.

Loading rock into trucks after the blast. Well drill in background.

The rebuilt washing-and-loading building with screen above and sand cone below.

# MEN OF THE INDUSTRY

The portrait printed on this page in each number of PIT AND QUARRY is selected without significance as to current events or the position of the individual in the industry



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**H. H. LINEAWEAVER**

President, Annville Stone Co.

Lebanon, Pa.

# Coming Events

**May 8, 1931. Houston, Tex.** Southwestern Regional safety conference. W. R. Moncure, mgr., Safety Dept., Chamber of Commerce, Houston, Tex.

**May 8-9. Washington, D. C.** Meeting of executive board, advisory board, president's council, and secretary's council, Associated General Contractors of America.

**May 11, 12, 1931. Cleveland, O.** Annual convention, Cast Stone Institute, Hotel Cleveland. C. G. Walker, asst. sec., 33 W. Grand Ave., Chicago.

**May 13, 14, 1931. West Baden Springs, Ind.** Mid-year meeting, board of directors, National Sand & Gravel Assn., West Baden Springs Hotel. V. P. Ahearn, exec. sec., Washington, D. C.

**May 14, 1931. St. Louis, Mo.** Monthly meeting, St. Louis Quarrymen's Assn., Forest Park Hotel. E. J. McMahon, exec. sec., 4063 Forest Park Blvd., St. Louis, Mo.

**May 15, 1931. Chicago, Ill.** Meeting, board of directors, National Ready-Mixed Concrete Assn., Congress Hotel. V. P. Ahearn, exec. sec., Munsey Bldg., Washington, D. C.

**May 15-16, 1931. Washington, D. C.** Annual meetings, American Road Builders Assn. and its City Officials and County Highway Officials divisions. Suite 938, National Press Bldg. Chas. M. Upham, engineer-director, same address.

**May 20, 1931. Fond du Lac, Wis.** Fox River Valley safety conference. F. W. Hainer, sec., Fox River Valley & Lake Shore Safety Council, Fond du Lac, Wis.

**May 21, 1931. Erie, Pa.** Northwestern Pennsylvania safety conference. S. M. Lippincott, sec., Erie Safety Council, Erie, Pa.

**May 21, 22, 1931. Columbus, O.** Annual meeting, National Concrete Burial Vault Assn. J. H. Stuart, sec., Bremen, O.

**June 3-4, 1931, White Sulphur Springs, W. Va.** Thirteenth annual convention, National Lime Assn., New Greenbriar Hotel. N. G. Hough, president and general manager, 927 15th St., N. W., Washington, D. C.

**June 8-12, 1931. White Sulphur Springs, W. Va.** Annual convention National Fertilizer Assn., New Greenbriar Hotel. Charles J. Brand, executive secretary and treasurer, 616 Investment Bldg., Washington, D. C.

**June 10, 1931. Buffalo, N. Y.** Mid-year meeting, Gypsum Assn., Statler Hotel. Henry J. Schweim, chief engineer, 211 W. Wacker Drive, Chicago, Ill.

**June 22-26, 1931, Chicago, Ill.** Thirty-fourth annual meeting, American Society for Testing Materials. Stevens Hotel. R. E. Hess, asst. secy., 1315 Spruce St., Philadelphia, Pa.

**October 12-16, 1931. Chicago, Ill.** National Safety Congress. W. H. Cameron, secretary, National Safety Council, 20 N. Wacker Drive, Chicago, Ill.

# Pumpings from the Old Pit

*Excerpts from the old files of* PIT AND QUARRY *reveal many interesting sidelights on the activities of the pits, quarries and plants of former days. These are printed in this column each issue.*

### *Fourteen Years Ago*

IN an address entitled "Hardpan and Clay We May Strike in 1917," delivered before the Indiana Sand and Gravel Producers' Assn., E. Guy Sutton, general manager, Carmichael Sand & Gravel Co., Williamsport, Ind., discussed the wartime situation in his industry. He stressed the heavy increase in operating costs due to the high prices of labor and supplies, but he was concerned chiefly with the prevalent freight-car shortage. He advocated concerted adherence to a policy of maintaining selling prices that would net at least a small profit.

* * *

The American Lime & Stone Co. fired a blast in its limestone quarry at Pemberton, Pa., which loosened about 140,000 tons of rock. Three months had been required to drill the thirteen holes, each 165 ft. deep. The ten tons of dynamite was loaded in six hours. Special arrangements were made with the Pennsylvania Railroad whereby its trains were flagged five miles on each side of the quarry during the blast.

* * *

### *Ten Years Ago*

READERS were invited to submit particulars concerning the use of auto trucks in delivering stone from a quarry face to a crushing plant. The following reasons were proposed to explain the slowness with which trucks were being adopted for this duty: (a) Most quarries were well equipped with tracks and cars; (b) Few operators were willing to be pioneers in new methods if considerable expenditures were involved; (c) Much loading of stone being by hand, high trucks were objectionable.

* * *

R. J. Morse, general manager, Colorado Portland Cement Co., refuted statements that were being published in Colorado in regard to the cost of cement manufacture. These figures were to be used in influencing the state legislature to establish a state mill in which cement could be made at 70c per barrel. According to Morse's estimate, the cost would be not less than $2.85, upon an annual production of 150,000 barrels.

* * *

The Northwestern Gravel Co. of Des Moines, Ia., already operating a plant at Lake View, was extending activities to two new plants, one at Gifford, the other at Grand Junction, Ia.

* * *

### *Five Years Ago*

THE Portland Cement Assn. moved from 111 W. Washington St. to its new building at 33 W. Grand Ave., Chicago, Ill.

* * *

At the ninth annual meeting of the National Slag Assn., held April 9, in the Old Colony Club, Cleveland, O., all officers were reëlected as follows: C. L. McKenzie, Duquesne Slag Products Co., president; C. E. Ireland, Birmingham Slag Co., vice-president; and H. J. Love, Cleveland, secretary-treasurer. P. H. Bates of the U. S. Bureau of Standards was honor guest at the meeting.

* * *

Secretary of Commerce Herbert Hoover wrote congratulatory letters to the United States Gypsum Co. and the North American Cement Corp. in announcing them as winners of bronze trophies, donated by *Explosives Engineer*, for operations without lost-time accidents. The first company received the award for its underground operations at Gypsum, O., and the latter company for its safe operations in its quarry at Security, Md.

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## Excavator Firm Changes Name Following Merger

At the annual meeting of the stockholders of the Monighan Manufacturing Corp., manufacturers of walking dragline excavators, the stockholders voted to change the name of the company to Bucyrus-Monighan Co. This action has been approved by the board of directors of the Bucyrus-Erie Co.

The Bucyrus-Monighan Co. will operate as a separate organization exactly as the Monighan Manufacturing Corp. did in the past except that sales will be handled by Bucyrus-Erie.

# Personal Mention

**Stanley Abel** of Taft, Cal., has been appointed a vice-president of the American Road Builders' Assn. to fill the vacancy caused by the death of the Hon. Samuel Hill of Seattle, Wash., who was an officer for many years. As former vice-president and president of the County Highway Officials' Division (1930-'31), Mr. Abel became familiar with the work of the Association and marked progress was made during his administration. He is owner and editor of the *American County* and *Highway Maintenance*, both published at Taft, Cal.

**T. W. Frech,** granted a leave of absence by the General Electric Co. on January 1, 1930, to organize the RCA Radiotron Co., has been re-elected to his former position as vice-president of the General Electric Co. in charge of incandescent lamps, effective April 15, it has been announced by Gerard Swope, president. **J. E. Kewley** will continue as manager of the incandescent-lamp department.

**George P. Torrence,** vice-president in charge of the Indianapolis plant of the Link-Belt Co., Chicago, and **Richard W. Yerkes,** secretary and treasurer, have been elected directors of the company.

**Edwin T. Hall,** for the past 15 years associated with the New England sales territory of the Sullivan Machinery Co., Chicago, has been made manager of that company's Boston office, succeeding the late George H. Richey.

**Herbert G. Gass** of the Herbert G. Gass Co., Greenfield, Mass., has been appointed New England distributor by the O. K. Clutch & Machinery Co., Columbia, Pa.

Mr. Gass will travel with a demonstrator compressor over the New England states and will appoint dealers and agents. He will also sell direct to users of hoists, air compressors and elevators made by the company.

**H. W. Robbins,** of Chicago, has been appointed editor of the non-metallic minerals experiment station of the U. S. Bureau of Mines, at New Brunswick, N. J. **Dr. H. H. Storch,** who has been stationed at New Brunswick, will take charge of the physical chemistry section of the Pittsburgh experiment station. Mr. Robbins has been for the last fifteen years with the Illinois Steel Co., at Chicago.

**Chester Driskell** of Edinburg, Ill., is installing a crusher at his farm near that town for the production of agricultural limestone. The stone, according to tests made by the Illinois department of agriculture, analyzes from 92 to 94 per cent calcium carbonate.

C. H. Adamson.

**C. H. Adamson,** secretary of Stephens-Adamson Mfg. Co., Aurora, Ill., conveyor and screen manufacturer, has assumed direct charge of sales and engineering in the Chicago territory. Mr. Adamson's headquarters are in the company's new, enlarged quarters in the Civic Opera Bldg., 20 North Wacker Drive. Mr. Adamson is well known in the district, having been director of Stephens-Adamson advertising and sales-promotional work for many years. He is a graduate of Carnegie Institute of Technology and an engineer of experience and unquestioned ability. Confidence in the growing importance of Chicago as a manufacturing center is given as the reason for the increased sales and engineering staff.

**Torna Barrera,** professor of geology at the National University of Mexico, and chief of the division on non-metallic minerals in the Institute of Geology, Mexico City, has been awarded a Guggenheim fellowship. He will work at Harvard University.

**H. B. Springer** has been advanced to the position of manager of contract sales, with headquarters in New York, by the Pennsylvania-Dixie Cement Corp. **Clark P. Brown** succeeds him as district sales manager in charge of Penn-Dixie's Philadelphia sales office.

**Henry C. Ische,** Milwaukee, has taken over the Hillside Sand & Gravel Co. at Prospect Hill, Wis.

**Theodore Marvin** has been appointed advertising manager of Hercules Powder Co. Mr. Marvin, who has been assistant advertising manager, assumes the post vacated April 5 by the death of **Nelson S. Greensfelder.** The new advertising manager has been an employee of Hercules Powder Co. for eight years. Like his predecessor, he was a graduate of the Colorado School of Mines. In 1923 Mr. Marvin became associate editor of *The Explosives Engineer,* published by Hercules Powder Company, and in 1925 became its editor. In 1929, he was appointed assistant advertising manager. Mr. Marvin has been active in both the advertising and technical publicity fields and is the author of handbooks on mining and tunnel methods. His appointment becomes effective immediately.

## Obituary

**George H. Richey,** New England representative of the Sullivan Machinery Co., Chicago, was instantly killed last month when he was struck by an express train near the West Medford, Mass., station. He was 41 years old and went to Boston from the West about 10 years ago.

**F. W. Bruch, 80,** president of the Fuller's Earth Co., 10616 Euclid Ave., Cleveland, O., died April 1, 1931, after a two-days' illness of spinal meningitis. He was also president of the Acme Machinery Co. of Cleveland, O. He is survived by his widow, two sons and one daughter.

**Ross Louthan,** 46, secretary-treasurer and general manager of the Northern Indiana Sand & Gravel Co., of Fort Wayne, Ind., died April 11, at his home in Fort Wayne. His death, caused by a stroke of apoplexy, followed an illness of only a few hours. He had been ailing for several months, but his condition had not been regarded as serious. Mr. Louthan, who was at one time a water-boy for the Grace Construction Co., worked his way up to the management of that company, and later became superintendent of the Western Construction Co. of Indianapolis. At the time of his death Mr. Louthan was a director of the Wayne Material Co. Surviving are the widow, Mrs. Claudia Louthan; a daughter, Phyllis Ann, aged 6 years; the mother, Mrs. William White of Fort Wayne; two sisters, Mrs. C. C. Dean of Fort Wayne and Mrs. Carl Frame of New York, N. Y., and four brothers, George, Orville and Kenneth of Fort Wayne, and Charles Louthan of Wolcottville, Ind.

# Traffic News and Comment

## Recent I. C. C. Decisions

*Crushed Stone* — The Commission has found the rates on crushed stone from Hillsville, Pa., to destinations in New York, Pennsylvania, and West Virginia not unreasonable or otherwise unlawful and has dismissed complaint No. 21,026, Carbon Limestone Co. v. P. R. R., et al.

*Dolomite* — The rates on raw dolomite stone from Gibsonburg, O., to Olean, N. Y., have been found unreasonable to the extent they exceeded $2.15 per net ton, c. l. min. wt. 90 per cent of the marked capacity of the car used. I. C. C. Docket No. 22,640, Frederick W. Kruse, et al. v. P. R. R., et al.

*Mica* — Upon reconsideration, the Commission has modified its decision in 168 I. C. C. 649, and has found that the rates on wet-ground mica and wet-ground mica schist are and will be unreasonable from Spruce Pine and Penland, N. C., to New England and eastern trunk line territories, to the extent they exceed or may exceed by more than 15 cents, the rate from Richmond to the same destination on wet-ground mica. Reasonable rates to destinations in central territory over routes not passing through trunk-line territory will not exceed 27 per cent of the first class rate from Spruce Pine to the same destinations. The commodity description of mica schist shown in the former report has been eliminated. I. C. C. Dockets: No. 22,191, J. P. Preston Co., Inc., et al. v. C. C. & O., et al.; No. 22,263, Richmond Mica Corp. v. A. C. & Y., et al.; No. 22,225, U. S. Mica Mfg. Co. v. C. C. & Q.; I. and S. No. 3,346.

*Agricultural Limestone and Dolomite*—The Commission has suspended the following tariffs effective April 10, until Nov. 10, insofar as they limit the application of the rates on dolomite and agricultural limestone to shipments, "in open cars only": Monon, Sup. 6 to I. C. C. 4,379, Sup. 12 to I. C. C. 4,396, I. C. C. 4,457 page 3; C. M. St. P. and P., Sup. 12 to I. C. C. B-4,659, Sup. 4 to I. C. C. B-5,995; I. C. R. R. Sup. 40 to I. C. C. A-10,079; Big Four, Sup. 171 to I. C. C. 8,351 and Sup. 13 to I. C. C. 8,453. I. C. C. Docket I. & S. No. 3,571, first supplemental order.

*Plaster*—The Commission has suspended the following tariffs showing rates on plaster from the Southwest to various destinations: C. R. I. & P. I. C. C. C-12,032; St. L. S. F. Sup. 11 to I. C. C. 9,130; J. E. Johanson's Sup. 16 to I. C. C. 2,143 and Sup. 12 to I. C. C. 2,204, effective April 14, suspended until November 14. I. C. C. Docket I. & S. No. 3,588.

### Fourth Section Relief

Fourth section order 10,527 has been supplemented to include sand, gravel, slag, chert, crushed stone and screenings coated with oil, tar or asphaltum, on rates prescribed in I. C. C. Docket No. 22,261, Interstate Amiesite Co. v. A. & R. R. R. Co.

*Cement* — Fourth-section relief in connection with rates on cement from east-bank Mississippi River crossings to points in Western Trunk Line territory has been requested by E. B. Boyd. App. No. 14,348.

*Ground Limestone* — Fourth-section relief in connection with the rates on ground limestone from Barber, Va., to points in southern territory has been requested by the C. & O. Ry. App. No. 14,349.

## Rate-Committee Dockets

### Trunk Line Assn.

*Cement*—Carriers propose to establish commodity rates on cement, c. l. min. wt. 50,000 lb., from Trunk Line territory, including the New Castle district to points on the Maryland and Pennsylvania R. R., in the following groups: Group 1, Baltimore to Towson Height, Md., inclusive; Group 2, Oakleigh to Forest Hill, Md., inclusive; Group 3, Sharon, Md., to Woodbine, Pa., inclusive; Group 4, Bridgeton to Springvale, Pa., inclusive; Group 5, Red Lion to Ore Valley, Pa., inclusive; and Group 6, East York, Pa. The proposed rates to Groups 1 and 5 are on the basis of 114 per cent of I. C. C. Docket 12,710 scale through; to Groups 2, 3 and 4 rates on basis of 114 per cent of Docket 12,710 scale through, plus 2 cents per 100 lb.; to Group 6 rates on flat York, Pa., basis. Docket No. M-1,711.

*Crushed Stone* — To meet motor-truck competition, carriers propose to reduce the rate on crushed stone, c. l. min. wt.[1] from Bethlehem (Chapman's Switch), Pa., to Port Richmond, Philadelphia, Pa., from $1.25 to $1.10 per net ton. Docket No. 26,494.

To meet motor-truck competition it is proposed to reduce the rate on crushed stone, c. l. min. wt.[1] from East Buffalo, Black Rock, Harriet and Buffalo stations, N. Y., to North Tonawanda, N. Y., from 75 cents to 60 cents per net ton. Docket No. 26,530.

Carriers propose a rate on crushed stone, c. l. min. wt.[1] from Casparis, Pa., to Glenwood, Pa., when for transshipment by or on barges and/or boats, of 80 cents per net ton f. o. b. cars, Glenwood. When for trans-shipment by or on barges and/or boats, an additional charge of 10 cents per ton, minimum 800 tons per barge or boat to be published to cover the use of the B. & O. dumping facilities. Docket No. 26,540.

To meet barge-canal competition it is proposed to reduce the rate on crushed stone, c. l. min. wt.[1] from South Amsterdam, N. Y., to Fort Hunter, Auriesville, Fultonville, and Randall, N. Y., from 75 cents to 65 cents per net ton. Docket No. 26,539.

*Pumice*—To meet motor-truck competition it is proposed to establish a rate of 28½ cents per 100 lb., to Johnstown, N. Y., and 29½ cents to Gloversville, N. Y., on pumice stone (lump, crude or powdered), c. l. min. wt. 30,000 lb., from N. Y. C. and W. S. stations, Brooklyn, Wallabout Basin, Long Island City, New York City stations (including lighterage within free lighterage limits of New York Harbor), Melrose Jct., Westchester Ave., Bronx station, Port Morris, N. Y., Jersey City, Newark Ave., N. J., to Edgewater, N. J., inclusive. Docket No. 26,441.

*Roasted Dolomite* — Shippers have asked the establishment on refuse roasted dolomite, loaded in open-top cars, c. l. min. wt. 60,000 lb., from Kenova, W. Va., to points on the B. & O. in Ohio and West Virginia, as published in B. & O., I. C. C. 21,184, same rates as carried therein on agricultural limestone when loaded in open-top equipment. Docket No. 26,492.

*Sand and Gravel* — To meet motor-truck competition it is proposed to establish a rate of 67 cents per net ton on sand and gravel, c. l. min. wt.[1] from Ballina, N. Y., to Skaneateles Jct., N. Y., to apply on traffic destined to points on the Skaneateles R. R. Docket No. 26,401.

*Sulphur*—To meet motor-truck competition it is proposed to publish a rate of 15 cents per 100 lb., on sulphur (crude, unground or unrefined), c. l. min. wt. 60,000 lb., from Baltimore, Md., to Winchester, Va. The present rate is 18 cents. Docket No. 26,477.

### Central Freight Assn.

*Cement*—Shippers are proposing the following rates on cement, c. l. min. wt. 50,000 lb., from Speeds, Ind. Rates shown in cents per 100 lb. Docket No. 28,193.

| To | Rate |
|---|---|
| Toledo, O. | 15 |
| Lima, O. | 13½ |
| Muncie, Ind. | 11½ |
| Frankfort, Ind. | 11½ |
| Kokomo, Ind. | 11½ |
| Ft. Wayne, Ind. | 13 |

*Chalk* — Reduced rates on precipitated chalk, in bags, barrels, boxes, in bulk, c. l. min. wt. 40,000 lb. from Mosher, Mo., have been proposed by shippers in Docket No. 28,171, as shown below. Rates are shown in cents per 100 lb., and the present rates apply on a c. l. min. wt. of 30,000 lb.

| To | Present | Proposed |
|---|---|---|
| Detroit, Mich. | 60 | 26 |
| Buffalo, N. Y. | 70½ | 31 |
| Cleveland, O. | 62 | 27 |
| New York, N. Y. | 86½ | 55 |
| Philadelphia, Pa. | 84½ | 52 |

*Fluxing Stone* — Shippers are asking for a reduction in the rate on flux-

ing stone, c. l. min. wt.[1] from Keeport, Ind., to Lansing, Mich., from $2.02 to $1.40 a net ton. Docket No. 28,117.

*Ground Limestone* — The following rates are proposed on limestone dust, c. l. min. wt. 40,000 lb., from Port Clinton, Ohio. Rates shown are per net ton. Docket No. 28,190.

| To | Rate |
|---|---|
| Akron, O. | $1.40 |
| Youngstown, O. | 1.50 |
| Pittsburgh, Pa. | 2.30 |
| Detroit, Mich. | 1.76 |

**Western Trunk Lines**

*Lime* — A reduction in the proportional rate on lime, c. l. min. wt. 60,000 lb., from Mississippi River crossings, on lime originating east of the Illinois-Indiana state line, to Utah common points, from 50½ cents to 49½ cents per 100 lb. is proposed. The crossings affected are Alton, E. Burlington, E. Clinton, E. Dubuque, E. Ft. Madison, E. Hannibal, E. Keokuk, E. Louisiana, E. St. Louis, Keithsburg, Quincy, Rock Island, and Savanna, Ill., and St. Louis, Mo. Docket No. 5,790-E.

*Limestone* — Shippers at Valmeyer, Ill., have asked for the publication of rates on limestone (crushed or ground) c. l. min. wt.[1] to various points in Kansas, on the basis of 8½ per cent of the first-class rate. Complete copy of exhibit will be furnished on request. Docket No. 6,025-C.

*Plaster*—An increase in the proportional rate on plaster and articles taking same rates, from Medicine Lodge, Kan., to Memphis, Tenn., for destinations beyond, from 18½ cents to 24½ cents is proposed. Docket No. 2,593-J.

*Stone, Sand and Gravel*—A lower scale of rates on crushed stone, sand and gravel, and other articles taking same rates, c. l. min. wt.[1] from and to points in Nebraska on intrastate traffic has been proposed. No reductions are proposed for distances over 100 miles and no switching charges are to be absorbed. Rates are to carry an expiration date of Dec. 31, 1931. The present and proposed scales are shown below, rates being per net ton. Docket No. 5,319-D.

| Miles | One Line | | Two Line | |
|---|---|---|---|---|
| | Pres. | Prop. | Pres. | Prop. |
| 25 | $0.70 | $0.40 | $0.90 | $0.60 |
| 40 | 0.70 | 0.45 | 0.90 | 0.65 |
| 50 | 0.70 | 0.50 | 0.90 | 0.70 |
| 60 | 0.80 | 0.55 | 1.00 | 0.75 |
| 70 | 0.90 | 0.60 | 1.10 | 0.80 |
| 80 | 1.00 | 0.70 | 1.20 | 0.90 |
| 90 | 1.10 | 0.80 | 1.30 | 1.00 |
| 100 | 1.20 | 0.90 | 1.40 | 1.10 |

**Southern Freight Assn.**

*Sand*—Carriers propose to cancel the present specific-commodity rates on moulding sand, from Louisville, Ky., to Bridgeport, Ala., and South Pittsburgh, Tenn., as provided in Agent Speiden's I. C. C. No. 1,408, of $2.20 per net ton and to apply in lieu thereof the rate of $1.75 per net ton provided in Agent Glenn's I. C. C. A-655, which is at present applicable via Sou. Ry., C. N. O. & T. P. Ry., Chattanooga, Tenn., and N. C. & St. L. Ry. It is also proposed to cancel present specific-commodity rates on moulding sand from Louisville, Ky., to N. C. & St. L. Ry. stations, Glencliffe, Tenn., to Murfreesboro, Tenn., inclusive, and to establish in lieu thereof, rates on sand of $1.58 per net ton based on I. C. C. Docket 17,517 scale, observing the Nashville, Tenn., rate of $1.58 as minimum. Docket No. 54,621.

*Tripoli*—It is proposed to establish rates on tripoli, powdered or pulverized, c. l. min. wt. 40,000 lb., and on crude tripoli, c. l. min. wt. 60,000 lb., from Silver Creek, Ga., to the following points, rates being shown in cents per 100 lb. Docket No. 54,778.

| To | Powdered | Crude |
|---|---|---|
| Atlanta, Ga. | 12 | 10 |
| New Orleans, La. | 27 | 23 |
| Savannah, Ga. | 23 | 20 |

**Southwestern Freight Bureau**

*Chalk* — Shippers of precipitated chalk at Mosher, Mo., are in competition with shippers of precipitated chalk from England and are, therefore, requesting that commodity rates be established to seaboard and lake points, which are all heavy points of consumption, in order to meet this competition. They have proposed a rate of 20 cents per 100 lb., on chalk (precipitated), in bags, barrels or boxes, in bulk, c. l. min. wt. 40,000 lb., from Mosher, Mo., to Chicago, Ill. (For other proposals, see C. F. A. Docket.) Docket No. 22,673.

*Keene's Cement*—Shippers contend that the rates on Keene's cement from Medicine Lodge, Kan., to Hamlin and Plasterco, Tex., of 15 cents per 100 lb. c. l. min. wt. 80,000 lb., as formerly carried in A. T. & S. F. Tariff 6,681-E, was on the proper basis, and propose that this rate be reëstablished with provision for the non-application of rates on Keene's cement between these points as named in S. W. L. Tariff 31-I. Docket No. 22,658.

*Feldspar*—Deposits of feldspar have been located at South Platte, Buffalo and Jefferson, Colo., and the millers of feldspar in Denver are desirous of having this material available for shipment to the destinations shown below. The proposed rates are in cents per 100 lb., on a c. l. min. wt. of 50,000 lb. Column A applies from Jefferson and Column B from Buffalo and South Platte. Docket No. 22,653.

| To | (A) | (B) |
|---|---|---|
| Ada, Okla. | 33 | 30½ |
| Tulsa, Okla. | 33 | 30½ |
| Muskogee, Okla. | 33 | 30½ |
| Sand Springs, Okla. | 33 | 30½ |
| Sapulpa, Okla. | 33 | 30½ |
| Blackwell, Okla. | 33 | 30½ |
| Bristow, Okla. | 33 | 30½ |
| Henryetta, Okla. | 33 | 30½ |
| Okmulgee, Okla. | 33 | 30½ |
| Poteau, Okla. | 33 | 30½ |
| Wichita Falls, Tex. | 33 | 30½ |
| Dallas, Tex. | 33 | 30½ |
| Ft. Worth, Tex. | 33 | 30½ |
| Athens, Tex. | 41 | 38½ |
| Marshall, Tex. | 41 | 38½ |
| Mt. Pleasant, Tex. | 41 | 38½ |
| Texarkana, Tex. | 41 | 38½ |
| Three Rivers, Tex. | 41 | 38½ |
| Shreveport, La. | 41 | 38½ |
| Bastrop, La. | 45 | 42½ |
| New Orleans, La. | 49 | 46½ |

**Trans-Continental Freight Bureau**

*Pumice*—A carload rate of 60 cents per 100 lb., on crude pumice, c. l. min. wt. 80,000 lb., from Cobre, Nev., to Chicago, Ill., and Detroit, Mich., has been proposed by shippers. Docket No. 12,302.

[1] The proposed carload minimum weight will be 90 per cent of the marked capacity of the car except, when car is loaded to full cubical or visible capacity, actual weight will apply.

## Advisory Board Reports

The forecast of car requirements of the Regional Shippers' Advisory Boards do not look encouraging in themselves since they indicate a decrease of 5.8 per cent in the carloadings of all commodities in the United States for the second quarter of 1931 under the actual loadings for the second quarter of last year. Only two of the fourteen boards show increases—the Ohio Valley, a total increase of 2.4 per cent, and the Pacific Coast board, an increase of 4.9 per cent. There is no way of ascertaining the amount of traffic moving by truck and barge that formerly moved by rail, but this amount is increasing rapidly and will, no doubt, account for a large part of the decrease shown.

Reports are available only on the commodities that move in large volume. The figures furnished by the various boards on commodities shipped by the non-metallic minerals industry are shown in the accompanying table, the "%" column showing the percentage of decrease under last year, except that figures followed by an asterisk (*) indicate the percentage of increase.

**FORECAST ON CAR REQUIREMENTS FOR SECOND QUARTER, 1931, AND LOADINGS FOR SAME PERIOD, 1930.**

| Board | Stone—Sand—Gravel | | | Cement | | | Lime and Plaster | | |
|---|---|---|---|---|---|---|---|---|---|
| | Actual | Estimate | | Actual | Estimate | | Actual | Estimate | |
| | 1930 | 1931 | % Off | 1930 | 1931 | % Off | 1930 | 1931 | % Off |
| New England | 14,138 | 12,724 | 10.0 | 4,606 | 4,698 | 2.0* | 3,383 | 3,079 | 9.0 |
| Atlantic states | 80,108 | 79,067 | 1.3 | 56,154 | 44,923 | 20.0 | 10,375 | 8,819 | 15.0 |
| Allegheny | 61,819 | 50,506 | 18.3 | 13,151 | 10,810 | 17.8 | 4,353 | 4,040 | 7.2 |
| Great Lakes | 74,049 | 72,488 | 2.1 | 12,326 | 11,700 | 5.1 | 14,773 | 14,775 | ..... |
| Ohio Valley | 57,783 | 60,903 | 5.4* | 13,287 | 14,482 | 9.0* | 1,909 | 1,909 | ..... |
| Midwest | 138,487 | 103,865 | 25.0 | 30,054 | 27,875 | 7.3 | 5,041 | 3,780 | 25.0 |
| Northwest | 17,926 | 20,000 | 11.6* | 5,447 | 5,011 | 8.0 | 536 | 485 | 9.5 |
| Trans-Mo.-Kansas | 71,293 | 71,293 | ..... | 22,702 | 21,045 | 7.3 | 3,947 | 3,710 | 6.0 |
| Southeast | 91,793 | 102,808 | 12.0* | 16,383 | 17,366 | 6.0* | 4,393 | 4,393 | ..... |
| Southwest | 81,846 | 81,846 | ..... | 11,178 | 12,296 | 10.0* | 3,132 | 3,132 | ..... |
| Central West | 27,619 | 34,795 | 26.0* | 7,221 | 8,775 | 21.5 | 201 | 200 | ..... |
| Pacific Coast | 35,281 | 35,300 | 0.1* | 9,814 | 12,758 | 30.0* | ..... | ..... | ..... |
| Pacific Northwest | 4,613 | 4,135 | 10.4 | 4,247 | 4,135 | 2.6 | 407 | 370 | 9.1 |
| Total, all boards | 756,755 | 729,730 | 3.6 | 206,570 | 195,874 | 5.2 | 52,450 | 48,692 | 7.2 |

# Financial News

*The information contained in these financial pages is given with the understanding that any statement on the part of this magazine or any of its staff, as to the responsibility or standing of any person, firm or corporation, or as to the value of any property or securities is a mere expression of opinion, given as a matter of service to the readers of* PIT AND QUARRY, *for which no responsibility in any way is to attach to this magazine or to any of its staff.*

## International Salt Co. 1930 Affairs Reviewed

Consolidated balance sheet of International Salt Co. and subsidiaries as of December 31, 1930, compares as follows:

| | 1930 | 1929 |
|---|---|---|
| **ASSETS** | | |
| *Property and plant | $13,543,942 | $11,250,099 |
| Cash | 918,964 | 777,085 |
| Call loans | ..... | 400,000 |
| Accts. receivable | 457,710 | 481,469 |
| Due from emp. | 220,671 | ..... |
| Inventories | 571,134 | 529,368 |
| Prepaid ins. | 11,846 | 13,482 |
| Investments | 22,493 | 38,858 |
| Bond discount | 248,723 | 252,114 |
| Sink. fund cash | 90 | 550 |
| Total | $15,995,573 | $13,743,025 |
| **LIABILITIES** | | |
| Capital stock | †$7,980,000 | ‡$6,077,130 |
| Bonds | 4,962,500 | 4,962,500 |
| Accts. payable | 78,409 | 89,427 |
| Notes payable | 231,000 | ..... |
| Accrued interest | 62,032 | 62,031 |
| Min. int. in subs. | 401 | 473 |
| Fed. tax reserve | 88,602 | 82,005 |
| Unclaimed dividends | 809 | 809 |
| Def. rents | 57,619 | 60,476 |
| Surplus | 2,534,201 | 2,408,174 |
| Total | $15,995,573 | $13,743,025 |

*After depreciation and depletion. †Represented by 240,000 no-par shares. ‡Par $100.

During the year, the company purchased the Sterling Salt Co. properties, mining from the same vein as International Salt Co.'s Retsof mine, and consolidated the operations.

"The economies resulting from this centralized operation have already proved the wisdom of our investment," Mortimer B. Fuller, president, stated in his remarks to stockholders. During the year, there were extraordinary and non-recurring charges in connection with the acquisition of the Sterling Salt properties and the change of the company's capital structure, in the total amount of $136,917," he stated.

"The plants and properties of the subsidiary companies have been maintained at a high standard, so that their present physical condition and operating efficiency are on the whole the best in their history.

"The management believes after analysis of the company's situation and investigation of prospective conditions among its principal customers, that net earnings for the year 1931 will appreciably exceed those of last year," Mr. Fuller said.

## Lehigh Portland Cement Earnings Satisfactory

Net income of Lehigh Portland Cement Co. for the twelve months ended March 31 was $2,140,304, after charges and taxes, equal, after 7-per cent preferred dividends, to $1.56 a share, on 450,348 common shares. In the preceding year the company reported for the twelve months ended Feb. 28 and showed net income of $2,441,042, or $2.13 a common share. The fiscal year has been changed to end Dec. 31 instead of Nov. 30.

## American Aggregates in Good Financial Position

F. D. Coppock, president of American Aggregates Corp., in submitting to the stockholders the annual report of the corporation for the year 1930, reports that during the 12-month period the firm produced and marketed 8,018,810 tons of material as compared with 10,305,020 tons produced and marketed during the year of 1929, a decrease of 2,286,210 tons. This decrease was represented largely by the failure of railways to purchase the usual quantities of ballast and by a marked decrease in commercial business in the Detroit territory. Loss in net sales was $1,282,870.00 as compared with net sales of 1929.

Notwithstanding the adverse circumstances, the corporation was able to earn a net profit, before Federal tax, of $406,146.34 and improved its cash position materially by the end of 1930 over that of December 31, 1929.

## Alpha Portland Reports Earnings of $1,198,812

The Alpha Portland Cement Co., for the 12 months ended March 31, 1931, reports net income of $1,198,812 after depreciation and federal taxes, equivalent after 7-per cent preferred dividends, to $1.49 a share on 711,000 no-par shares of common stock. This compares with $1,654,098 or $2.13 a share in the preceding 12 months.

Surplus account was as follows: Earned surplus April 1, 1930, $3,753,735; add: Net income for 12 months ended March 31, 1931, $1,198,812; total surplus $4,952,547; deduct: Preferred dividends $140,000; common dividends $1,244,250; additional depreciation for year 1928 as adjusted by Treasury Department $32,366; provision for additional federal taxes prior years $200,000; adjustment of sack inventory to market value at December 31, 1930, $95,657; earned surplus March 31, 1931, $3,240,274.

Consolidated income account for the 12 months ended March 31, 1931, compares as follows:

| | 1931 | 1930 |
|---|---|---|
| Net sales | $9,580,011 | $11,183,880 |
| Operating expenses | 7,025,224 | 8,279,150 |
| Depreciation | 1,345,253 | 1,307,497 |
| Operating profit | $1,209,534 | $1,597,233 |
| Other income (net) | 159,278 | 281,865 |
| Total income | $1,368,812 | $1,879,098 |
| Federal taxes | 170,000 | 225,000 |
| Net income | $1,198,812 | $1,654,098 |
| Preferred dividends | 140,000 | 140,000 |
| Common dividends | 1,244,250 | 2,133,000 |
| Deficit | $185,438 | $618,902 |

### CURRENT DIVIDENDS

| COMPANY | CLASS OF STOCK | DIVIDEND RATE | HOLDERS OF RECORD | PAYABLE |
|---|---|---|---|---|
| Alpha Portland Cement | Common | $0.25 qr. | Apr. 1 | Apr. 25 |
| American Aggregates Corp. | Preferred | $1.75 qr. | Mar. 20 | Apr. 1 |
| Arundel Corp. | Common | $0.75 qr. | Mar. 23 | Apr. 1 |
| Bessemer Limestone & Cement | Class A | $0.75 qr. | Apr. 20 | May 1 |
| Boston Sand & Gravel | Preferred | $0.87½ qr. | Mar. 21 | Apr. 1 |
| Boston Sand & Gravel | Common | $0.30 qr. | Mar. 21 | Apr. 1 |
| Calaveras Cement Co. | Preferred | $1.75 qr. | Mar. 31 | Apr. 15 |
| Consolidated Oka Sand & Gravel | Preferred | $1.75 qr. | Mar. 24 | Apr. 1 |
| Consumers Co. | Preferred | $1.50 qr. | Mar. 25 | Apr. 1 |
| Coronet Phosphate | Common | $1.50 qr. | Mar. 25 | Apr. 1 |
| Dolese & Shepard | Common | $1.00 qr. | Mar. 20 | Apr. 1 |
| Dufferin Paving & Crushed Stone | Preferred | $1.75 qr. | Mar. 20 | Apr. 1 |
| Fitzsimons & Connell | Preferred | $1.75 qr. | Mar. 21 | Apr. 1 |
| Fitzsimons & Connell | Common | $0.50 qr. | May 21 | June 1 |
| Great Lakes Dredge & Dock | Common | $0.25 qr. | May 5 | May 15 |
| Gypsum, Lime & Alabastine, Ltd. | Common | $0.20 qr. | Mar. 28 | Apr. 1 |
| International Salt | Common | $0.75 qr. | Mar. 16 | Apr. 1 |
| Johns-Manville | Preferred | $1.75 qr. | Mar. 11 | Apr. 1 |
| Johns-Manville | Common | $0.75 qr. | Mar. 25 | Apr. 15 |
| Kelley Island Lime & Transport | Common | $0.62½ qr. | Mar. 20 | Apr. 1 |
| Lehigh Portland Cement | Preferred | $1.75 qr. | Mar. 14 | Apr. 1 |
| Lehigh Portland Cement | Common | $0.25 qr. | Apr. 14 | May 1 |
| Medusa Portland Cement | Preferred | $1.50 qr. | Mar. 25 | Apr. 1 |
| Medusa Portland Cement | Common | $0.75 qr. | Mar. 25 | Apr. 1 |
| National Gypsum | Preferred | $1.00 qr. | Mar. 20 | Apr. 1 |
| Newayo Portland Cement | Preferred | $1.75 qr. | Mar. 25 | Apr. 1 |
| New York Trap Rock | Preferred | $1.75 qr. | Mar. 20 | Apr. 1 |
| Owens-Illinois Glass | Preferred | $1.50 qr. | Mar. 16 | Apr. 1 |
| Pacific Portland Cement | Preferred | $1.62½ qr. | Mar. 31 | Apr. 4 |
| Pennsylvania Salt | Common | $0.75 qr. | Mar. 31 | Apr. 15 |
| Pittsburgh Plate Glass | Common | $0.50 qr. | Mar. 10 | Apr. 1 |
| Raymond Concrete Pile | Preferred | $0.75 qr. | Apr. 20 | May 1 |
| Raymond Concrete Pile | Common | $0.50 qr. | Apr. 20 | May 1 |
| Santa Cruz Portland Cement | Common | $1.00 qr. | Mar. 21 | Apr. 1 |
| Superior Portland Cement | Class A | $0.27½ M | Apr. 23 | May 1 |
| Wallace Sandstone | Preferred | $1.50 S.A. | Mar. 30 | Apr. 15 |
| Warner Company | Common | $0.50 qr. | Mar. 31 | Apr. 15 |
| Warner Company | 1st Pfd. | $1.75 qr. | Mar. 14 | Apr. 1 |
| Warner Company | 2nd Pfd. | $1.75 qr. | Mar. 14 | Apr. 1 |

# Review of Foreign Practice

## Magnesian Raw Material in Cement Manufacture

High magnesia content in sintered Portland cement has a damaging effect on soundness and the German specifications limit the magnesia content to 5 per cent. However, Dr. K. Balthasar discussed the production of good Portland cement with high magnesia content several years ago (*Tonindustrie-Zeitung* 1925, No. 19), although unfortunately he gave no information on the degree and duration of the temperature employed. Recently a patent has been taken out covering a process for the same result, with information on the temperatures required.

If the magnesia is present in the form of carbonate, the carbon dioxide begins to be driven off at around 700 deg. C., and the resulting bases, calcium and magnesium oxides, react with the acidic constituents of the raw materials, particularly with the silica. From this reaction (700 to 1,000 deg.) results a yellow friable mass. At 1,000 to 1,400 deg., this is converted to a hard, dark gray slag, the bases having combined with the acidic materials. If the raw material has a hydraulic modulus of at least 1.9, we have the remarkable phenomenon that the magnesia has prevented a part of the lime from combining with the acids. If this clinker is stored in the open a day or two, it shows the characteristic unsoundness, and in the disintegrating mass one can see small white points of free lime. But if the burning temperature is raised beyond 1,450 deg. and left at this temperature at least 20 minutes, there is a further chemical reaction. The excess lime drives the magnesia out of combination, producing a hard, blue-green clinker which shows no unsoundness in storage. The clinker consists mainly of alite, which is the essential element of serviceable Portland cement. But, if the hydraulic modulus lies below 1.8, celite is formed and the clinker produced is not sound.

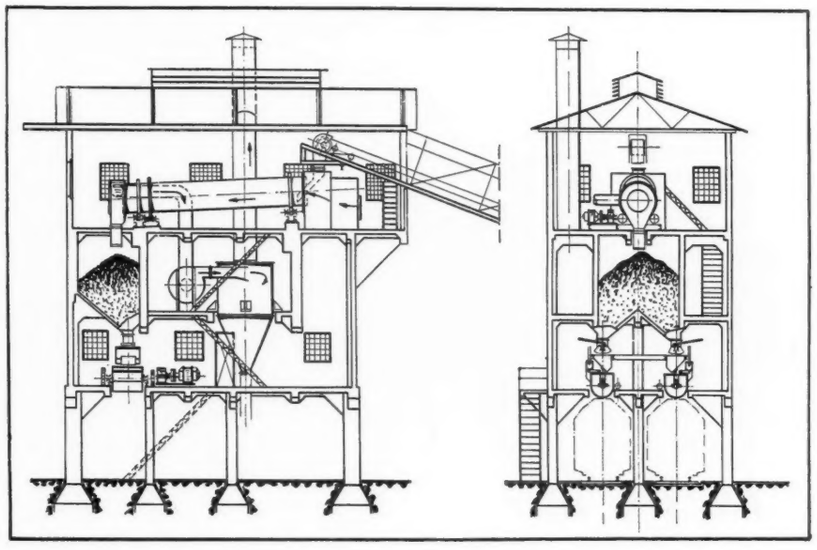
If the magnesia is present as magnesium silicate, as when blast-furnace slag is used, a stable clinker equivalent to Portland cement in color and specific gravity is produced even with a hydraulic modulus below 1.8, at temperatures of 1,200 to 1,400 deg., although this clinker has not quite the strength of Portland. If one chooses a hydraulic modulus over 2, a good Portland cement consisting principally of alite is obtained with a temperature of over 1,400 deg. and a 20-minute duration of burning.

Such methods of burning completely eliminate the injurious action of the magnesia, and the cement produced corresponds and even exceeds the standard specifications for Portland cement. Burning in a shaft kiln with revolving grate is proposed for the technical handling of the raw material.—Dr. Ing. Walter Marschner in *Zement* 20:265-6, March 19, 1931.

## German Stone Producer Has Tar-Macadam Plant

The demand for proper materials for the construction of bituminous pavements in Germany and the advantages of correctly and uniformly prepared tar-coated stone makes it possible for German producers of crushed stone to create new markets for their product by installing bituminous plants in connection with their crushing plants. A recent installation made especially for the production of this material is that of the Vereinigte Stahlwerke near Duisburg. The crushing plant consists of two identical units. Cars from the quarry discharge, by means of rotary car-dumpers, to two gyratory crushers of 40-tons hourly capacity each. The crushed material is conveyed to a scalper screen and the oversize is passed to a secondary crusher the product of which returns to the screen. The same screen removes the dust below 3 mm. The material from 3 to 55 mm. is conveyed by a long belt to the screening and tarring plant or, in summer, it is possible to by-pass the drier. The entire crushing plant is served by a dust-collecting system.

In the screening plant, the material enters a sizing screen, where it is separated into the desired materials, and the products fall into bins holding about one day's production. The stone then can be loaded directly into cars without the tar coating or it can be delivered to either of two trough mixers which prepare the road material and drop it to cars below. This plant has a capacity of 20 to 30 tons an hour. It also includes a reduction roll crusher so that the larger sizes can be broken down to the smaller tar-macadam sizes when desired.—*Die Stein-Industrie* 26:31-5, Feb. 5, 1931.



Sizing and tarring unit at new German crushed-stone and tar-macadam plant.

## Cement Plant in Syria Promoted by Arab Firm

The faint beginnings of a national industry in Syria has been given considerable impetus in the realization of the project for a domestic cement plant which, furthermore, will be a purely Arabian local company to carry out the construction without foreign capital. The influence of the French mandate in Syria, the construction of roads, bridges, harbor works, city enlargements, and the consumption of cement made necessary thereby, have naturally provoked the idea of a domestic cement production; especially as a Lebanese group, in coöperation with a French group, had undertaken, some time ago, the erection of a modern cement factory on the Mediterranean Coast in the neighborhood of Tripoli.

The Société Nationale pour la Fabrication du Ciment et des Materiaux de Construction, Damascus, has a capital of some $500,000, and intends to erect, in the immediate vicinity of Damascus, in the Lebanon Mountains, a dry-process cement plant with one kiln, for a daily capacity of 100 tons of cement. The raw material deposits are very favorable and adjacent to the plant site.—*Zement* 20: 286, March 19, 1931.

# Recent Patents

## AMERICAN

**Cement**

*Mortar-mixer.* Eric O. Hamren, Oshkosh, Wis. No. 1,799,228.

*Cement-kiln.* John C. Buckbee, Chicago, Ill. No. 1,800,247.

**Concrete**

*Truck concrete-mixer.* Gebhard Jaeger, Columbus, O., assignor to Jaeger Machine Co., same place. No. 1,801,162.

**Crushing**

*Crusher.* Ray C. Newhouse, Wauwatosa, Wis., assignor to Allis-Chalmers Mfg. Co., Milwaukee, Wis. No. 1,799,476.

*Crusher.* Ray C. Newhouse, Wauwatosa, Wis., assignor to Allis-Chalmers Mfg. Co., Milwaukee, Wis. No. 1,799,477.

*Pan for crushing mills.* Samuel B. Stine, Osceola Mills, Pa. No. 1,800,705.

**Excavating**

*Dipper-tooth.* John D. Rauch, Lima, O. No. 1,799,929.

*Tunneling machine.* Milton R. Sheen, Philadelphia, Pa., assignor to Tunnel Machine Mfg. & Engineering Co., same place. No. 1,800,361.

*Tunneling machine.* Frank A. King, Denver, Colo. No. 1,800,541.

*Excavator bucket.* Charles F. Yocum, Findlay, O., assignor to Buckeye Traction Ditcher Co., same place. No. 1,801,033.

## FOREIGN

**Cement and Concrete**

*Process for unwatering cement slurry in a horizontal, rotating centrifugal housing.* G. Polysius Akt.-Ges., Dessau, Germany. German 522,022.

*Process for production of containers with concrete lining resistant to chemical and thermal action.* Prodor Fabrique de Produits Organiques Soc. Anon. and Dr. Marcel Levy, Genf. German 522,660.

*Process for manufacture of fused cement in a hearth kiln.* Stefan Kohut, Berlin-Lichterfelde, Germany. German 523,109.

*Rotary kiln for fusing cement.* G. Polysius Akt.-Ges., Dessau, Germany. German 522,567.

**Crushing and Grinding**

*Jaw-crusher installation.* Arno Andreas, Munster i. W., Germany. German 522,533.

*Device for cooling the bearings of hammer mills.* Societe Anonyme des Appareils de Manutention et Fours Stein, Paris. German 522,951.

**Drilling**

*Hammer drill.* Flottmann Akt.-Ges., Herne i. W., Germany. German 522,159.

*Well drill.* Emil Schweitzer, Neukirchen, Germany. German 523,110.

**Drying**

*Device for blowing material into rotary driers.* I. G. Farbenindustrie Akt.-Ges., Frankfurt a. M., Germany. German 522,460.

**Gypsum**

*Process for the manufacture of highly porous heat-insulating materials from gypsum and aggregate.* Rheinhold & Co., Vereinigte Kieselguhr- und Korkstein-Gesellschaft, Berlin. German 522,139.

*Process for production of peat blocks with a plastering of gypsum or similar mortar materials.* Richard Schubert, Bremen, Germany. German 522,553.

**Materials-Handling**

*Portable distributing device for construction materials.* Joseph Edmund Cardell, Huddersfield, England. German 522,547.

*Table feeder for uniform feeding of bulk materials.* Karl Besta, Ratingen i. Rhld., Germany. German 522,458.

*Belt system for loading bulk materials.* Bamag-Meguin Akt. Ges., Berlin. German 523,020.

*Conveying device for bulk materials.* Adolf Bleichert & Co. Akt.-Ges., Leipzig. German 522,952 and 522,953.

**Mixing**

*Concrete mixer.* Gebhard Jaeger, Columbus, Ohio. German 522,156.

*Concrete mixer.* Fritz Kirch, Nassau a. d. Lahn, Germany. German 522,023.

*Device for tipping drum mixers.* Karl Peschke Maschinenfabrik, Zweibrucken, Germany. German 522,024.

*Mixing-time regulator for tipping drum mixers.* Karl Peschke Maschinenfabrik, Zweibrucken i. d. Pfalz, Germany. German 522,854.

**Sacking**

*Bag holder.* The National Marking Machine Co., Cincinnati, Ohio. German 522,352.

**Screening and Separating**

*Air separator.* Alpine Akt.-Ges. Eisengiesserei und Maschinenfabrik Augsburg, Augsburg, and Albert Kuhr, Goggingen, Germany. German 522,534.

**Unclassified**

*Process and apparatus for manufacture of cast articles, concrete blocks and the like.* Ernest George Enticknap, Alton, England. German 522,025.

*Process for making pipe from cement and fabric.* George Rogers Sutton, Pymble, N. S. W., Australia. German 522,550.

*Process for production of asbestos-cement tiles with coloring.* August Fricke, Berlin-Charlottenburg, Germany. German 522,855.

*Sintering machines.* The American Ore Reclamation Co., assignee of Edward W. Shallock, Chicago. Canadian 301,083, 301,084 and 301,085.

*Continuous machine for removing water from slurry.* Figli di Carcano Gerolamo, Maslianico, Como, and Societa Invenzioni Brevetti Anonima Torino, Turin, Italy. Canadian 310,249.

*PIT AND QUARRY will furnish, at its actual cost, a copy of any patent cited here. A charge of ten cents per copy is made by the U. S. Patent Office, Washington, D. C., and readers may procure a copy directly by addressing the Commissioner of Patents, with payment for copies requested. Postage stamps are not accepted by the Patent Office. We will endeavor to obtain copies of foreign patents for our readers but we cannot give assurance in every case for the reason that copies of such patents are not printed for distribution as liberally as are the American copies, nor is there a fixed charge per copy.*

## Allis-Chalmers Acquires Advance-Rumely Assets

Acquisition by the Allis-Chalmers Manufacturing Co. of the plant and sales offices of the Advance-Rumely Corp. of La Porte, Ind., has been announced by Max W. Babb, vice-president of Allis-Chalmers.

Neither the description of the properties and assets to be acquired nor the purchase price were disclosed. Consummation of the deal, however, requires only the investigation of auditors, Mr. Babb said.

The lines controlled by Allis-Chalmers and Advance-Rumely do not overlap but supplement each other. The acquisition of the assets of Advance-Rumely will largely augment the business of Allis-Chalmers in the agricultural machinery field.

## Harnischfeger Moves to Empire State Building

Harnischfeger Sales Corp., Milwaukee, Wis., announces that the Empire State Bldg. is the new address of the Harnischfeger New York office. Removal from the old offices in the Hudson Terminal Bldg., 50 Church St., took place April 27. The new offices are on the twenty-fifth floor.

## Tennessee Stone Quarry Announces Name Change

The name of the Artstone Quarries at Crossville, Tenn., has been changed to Crab Orchard Quarries, Inc., according to E. Rhode, vice-president and general manager. W. A. Goss is superintendent. This company produces a variety of stone that is used for flagging, wainscoting, flooring, risers, stair treads, coping, roofing, ashlar and memorials.

## Los Angeles Engineers Visit Victorville Plant

The Southwest Portland Cement Co., of Victorville, Cal., had the pleasure of entertaining the members of the Engineers Club of Los Angeles, recently when they stopped over in Victorville while on a trip to inspect the site of the new Hoover Dam. The club plans making this trip to the Hoover Dam an annual event.

# Manufacturers' Publications

*Each publication listed below contains information of interest to non-metallic mineral producers. Readers may obtain, without charge—except where a price may be stated—and without obligation, copies of any of these publications by writing directly to the manufacturers who publish them. Please mention* PIT AND QUARRY *when writing.*

**Blasting**

"Quarrying Vanport Limestone." 2 p., 4 ill. (*The Dupont Magazine* for April. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.) Describes and illustrates blasting practices employed in western Pennsylvania limestone quarries.

**Classifiers**

*Auto-Vortex Classifier.* 12 p. Illustrated. (Bulletin No. 9. Charles E. Wood, Baxter Springs, Kan.) Describes and illustrates an automatic, hydraulic sand-and-gravel washer and classifier of the automatic cone type. Requires no power to operate. Views of plants where the device is successfully operating are shown.

**Conveyors**

*Fairfield Portable Belt Conveyors.* 16 p. Illustrated. (Bulletin No. 40-1. The Fairfield Engineering Co., Marion, O.) Describes and illustrates portable belt conveyors in 20-in. and 24-in. widths for application on hauls up to 60 ft. per unit. Shows their operation in handling a wide variety of materials. Electric or gasoline power optional.

**Dump Wagons, Tractor**

*The Camel Is Here!* (Shunk Mfg. Co., Bucyrus, O.) A folder in colors which describes and illustrates an automatic gravity tractor dump wagon of four- to five-cubic yards capacity.

**Electrical Equipment**

*New Threadless Condulets.* 48 p. Illustrated. (Bulletin 2218. Crouse-Hinds Co., Syracuse, N. Y.) Describes and illustrates threadless condulets, couplings and connectors for rigid conduit and electrical metallic tubing.

**Engines, Diesel**

*Atlas Imperial Full Diesels.* 4 p., 4 ill. (Bulletin No. P-1593. Atlas Imperial Diesel Engine Co., Oakland, Cal.) Describes and illustrates a portable Diesel power unit for crushing plants, dredges, etc. Brief specifications are included.

"How a Diesel Engine Works." 2 p. (*The Ground Hog* for March-April. Marion Steam Shovel Co., Marion, O.) The first of a series of articles to give the reader a thorough understanding of the fundamentals of design, care and operation of Diesel engines.

**Excavators**

*GA-3 Bucyrus-Erie Gas Plus Air.* 20 p. Illustrated. (Bulletin FGA-31. Bucyrus-Erie Co., South Milwaukee, Wis.) Describes and illustrates a new 1¼-cu. yd. shovel-dragline-clamshell-crane. Explains the principle of the "gas plus air" power and features the improvements made by the manufacturers in bringing out this new model.

*Hanson Full-Revolving Excavators.* 4 p., 7 ill. (The Hanson Clutch & Machinery Co., Tiffin, O.) Describes and illustrates two excavators, convertible from shovel to clamshell, dragline, truckhoe or crane. Model 22 is a general utility unit with a capacity of ¼ to ⅜ cu. yd. Model 32 is a larger machine with a rated capacity of ⅜ to ½ cu. yd.

**Feeders**

*Link-Belt Heavy-Duty Apron Feeders.* 8 p. Illustrated. (Bulletin 1251. Link-Belt Co., Chicago, Ill.) Describes and illustrates a new apron feeder, constructed of manganese steel, for use in non-metallic mineral plants.

**Hard-Facing Compounds**

*Armite.* 12 p. Illustrated. (The Armite Laboratories, Los Angeles, Cal.) Describes and illustrates a group of new hard-facing products for application on friction surfaces by the electric-arc or oxy-acetylene method. The new material finds a wide use about pits and quarries for surfacing drill bits, dipper teeth, crushed plates, etc.

**Motors, Synchronous**

*Type HR "Simplex" Synchronous Motors.* 4 p., 8 ill. (Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.) Describes and illustrates a series of synchronous motors of from 200 to 1,500 horsepower, 138 to 450 r.p.m. and 100 to 80 per cent. power factor. Illustration shows a 300-hp. motor driving a tube mill in a Portland-cement plant.

**Plant Equipment**

*Rotary Kilns, Coolers and Driers.* 32 p. Illustrated. (Bulletin 1457B. Allis-Chalmers Mfg. Co., Milwaukee, Wis.) Describes and illustrates the rotary-type kilns, driers and coolers made by this concern and shows their application in a number of interesting installations in cement and line plants.

**Power Transmission**

*The Lindahl Line of Pulleys and Sheaves.* 64 p. Illustrated. (Catalogue No. 24. Henry Lindahl Foundry & Machine Co., Chicago, Ill.) A new catalogue describing and illustrating a complete line of pulleys, sheaves, V-belts and other equipment for the transmission of power.

*Speed Reducers and Small Motors.* 8 p. Illustrated. (Bulletin No. 2905. Denver Equipment Co., Denver, Colo.) Describes and illustrates a series of speed reducers with ratios as high as 4,000 to 1. Small motors in ratings of ⅙ to 10 horsepower are also listed, with specifications.

**Scrapers**

"Small Scraper Feeds Gravel to Interesting New Ohio Plant." 3 p. 3 ill. (*Sauerman* News for March-April. Sauerman Bros., Inc., Chicago, Ill.) Describes and illustrates the application of a power-drag scraper in excavating and transporting material at the C. A. Heyl sand-and-gravel plant at Barberton, O.

**Wire Rope**

"Right and Wrong Ways of Handling Wire Rope." 3 p., 9 ill. (*Wire Engineering* for March, 1931. John A. Roebling's Sons, Trenton, N. J.) Describes and illustrates the correct and incorrect methods of coiling and uncoiling wire rope. The illustrations amplify the story to a high degree.

# New Corporations

AMERICAN TRAVERTINE LIME CO., Boise, Idaho. $100,000. V. P. Coffin, Mrs. V. P. Coffin and R. J. Jones. Will develop deposits for agricultural purposes.

QUARRY PRODUCTS CO., 169 Main St., Menasha, Wis. $60,000. Lars H. Wahl, pres.; Clarence B. Peterson, v.-pres.; Harold W. Peterson, sec.; Alfred G. Peterson, treas.

VAN CAMP STONE CO., Cincinnati, Ohio. $50,000. John P. Goldsberry, Charles H. Elston, and John V. Campbell, First Nat. Bank Bldg., Cincinnati.

CONSUMERS GRAVEL CO., INC., New Orleans, La. $30,000. Wm. L. Stevens, 1017 Peniston St., Roland A. Thomas.

BARTON COUNTY ROCK ASPHALT CO., Iantha, Mo. $16,000. J. E. Wicker and Joe H. Gill, Liberal, Mo.

VICTORIA MATERIALS & GRAVEL CO., 916 Tyler St., Victoria, Tex. $25,000. O. L. Neyland, C. C. Carsner and Gertrude L. Richey.

OTTUMWA SAND CO., Ottumwa, Iowa. $10,000. C. L. Mikesh, pres.; C. J. Mikesh, Cedar Rapids, Iowa, sec.-tr.

O'CONNELL LIME CO., 50 Union Square, New York City. $2,000. D. C. Robertson.

LEXINGTON PRODUCTS CORP., Richmond, Va. $300,000. Frank T. Cycker, Land Title Bldg., Philadelphia, Pa.

PIRU ROCK CO., LTD., Los Angeles, Cal. $200,000. Hugh W. Jones, George H. Grabe of N. Hollywood and J. H. Lemmon, Piru.

MARION GRAVEL CO., INC., Marion, Ind. 250 sh. $100 each. Frank L. Deer, Leon L. Deer, S. G. Cohen, L. A. Young and Walter Fudge.

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The Rockford Stone Co. of Rockford, O., producer of crushed stone, has resumed operations at its quarry and plant. Production ceased early last fall, winter sales having been made from storage.

# Insurance Problems Discussed

## Windstorm Insurance

WITHIN two days after a tornado, more windstorm insurance is sold in a radius of one hundred miles of the storm than in the preceding five years. Wind protection is most commonly bought "while the iron is hot." The insurance follows a storm rather than the need. The reason for this, however, is quite logical. Insurance is intangible. It takes imagination as well as business shrewdness to foresee risks, and a nearby catastrophe helps to visualize a loss and the subsequent value of coverage.

False pride is sometimes a handicap in correcting a business error. Many a time, after a neighbor has had some accident, a customer has come to his broker sheepishly murmuring about "locking the stable door after the horse is stolen." But it is not as bad as that. If a producer lacks some essential form of insurance protection, it is more likely to result from ignorance than from poor judgment. Hearing of a catastrophe opens up the subject, and buying insurance after the storm is sensible because heavy winds occasionally do hit the same area twice.

### A Timely Question

It is rather popular to associate winds with the winter season in the northern part of the United States. Probably the air is more constantly astir then than at other times. And winter winds are more noticeable because they sting one's face with snow and sleet. But the discomfort of cold should not be confused with the danger of a tornado or wind of destructive force.

The year 1930 not only followed the course of history by producing tornadoes in every one of the twelve months, but it laid a special warning on May and June. We like to think of these months in terms of sunshine and balmy breezes. Yet by far the greatest number of destructive storms of 1930 came in May. The Monthly Weather Review of the U. S. Dept. of Agriculture required nearly three pages to list the May tornadoes and hail and wind storms, and only one page or less for every other month of the year.

### May Day Storms

May 1, while witnessing spring flowers and outdoor dances in most places, nevertheless saw thirty-two tornadoes. The total for the month was seventy-eight tornadoes in various parts of the country.

Grand Rapids, Mich.—sometimes thought to be out of the main tornado belt—suffered a disastrous storm on May 2, 1930. Altogether there were six tornadoes in central Michigan doing an aggregate damage of over $1,200,000. The *National Underwriter*, in reporting the news of this storm, said, "This is the fourth tornado in Grand Rapids in the history of the weather bureau. It destroyed factories, residences, public utilities and trees. It was among the most severe storms of the year and should go far to dispel the notion that territory east of the Mississippi River is immune from tornadic visitation. The Grand Rapids tornado cut a path four miles long and 350 feet wide."

### Storms in the East

Of the five greatest storms of 1930 practically all were at times and places where no one would ever have looked for them. In addition to the Grand Rapids tragedy, there was also, on May 1, a tornado in Wisconsin which traveled across the state from Trempealeau County to Lake Michigan, wreaking damage to property of about $1,100,000. On June 13, well into the summer, another million-dollar storm swept from Ellsworth to Addison, Wis.

Although the worst storm of the year, according to weather bureau records, was a tornado which followed a course from Bynum to Frost, Tex., the total property loss being reckoned at $2,000,000, this was hardly the most unlooked-for catastrophe. To anyone not familiar with long-term statistics, the most astounding storm of the year occurred August 16, covering parts of Massachusetts and Connecticut. We don't often look for destructive winds in the height of the summer, and New Englanders anyway have a tendency to think that tornadoes ought to stay out in Kansas or Oklahoma. Yet this Massachusetts-Connecticut affair did damage of $1,500,000 by wind, hail, lightning and cloudburst.

### Where Winds Hit

One can perhaps visualize the scope of the wind risk by glancing at the following list of some of the storms of 1930:

May 1, Dunavant, Kan., to Smithville, Mo., damage $500,000; Rosendale to Union Star, Mo., damage $450,000; Decatur, Ill., damage $100,000; Garden Prairie, Ill., damage $25,000;
May 5, Maywood, Ill. (a suburb of Chicago).
May 8, Hastings, Neb., damage $750,000; Weatherford, Tex., damage $500,000.
May 12, Oklahoma, damage $450,000, involving parts of the following counties: Major Woods, Alfalfa, Kiowa, Custer, Grant and Washita.
May 17, Clebourne, Tex., damage $500,000.
May 27, Streator, Ill., damage $150,000.

In other months than May some of the outstanding 1930 storms were:

Feb. 24, Roseville, O., $150,000.
July 11, Evansville, Ind.
July 20, Marathon, Portage and Waupaca Counties, Wis.
July 22, Red Lion to Seaside Park, N. J., $175,000.
July 27, Coddington, Wis.
Sept. 14, Mount Vernon, Ill., $500,000.

These statistics are not printed to "howl calamity." We do not believe that the storms of last May, June and July will be repeated in exactly the same manner during 1931. The world is not run that way. But the record of last year is a very valuable lesson in showing that destructive storms do occur in unexpected times and places.

Between the Rocky Mountains and the Mississippi River, the insurance agents are not much more than order takers with respect to windstorm insurance. Almost all property owners believe in this protection and carry it as fully as they do fire and workmen's compensation coverage.

Object lessons are less frequent east of the Mississippi, although a considerable risk exists throughout this territory, centering especially on the north central states. It is not necessary to have a "twister" strong enough to knock your building down in order to suffer a total loss. Your structure might explode (yes, even a substantial brick factory) in the vacuum which follows the first wind pressure, foundations might be cracked and twisted, or your building might burn to the ground following minor wind damage. Such accidents can occur in the east as well as on the prairies.

Tornadoes usually travel from southwest toward northeast. If you get in the path of a tornado maybe you can save yourself by running fast enough and far enough to the southeast or northwest and look for a comfortable hole in the ground. But you cannot remove your buildings from a danger zone; so for their protection we can only suggest insurance.

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## Missouri Rock-Asphalt Plant Capacity Doubled

The Hufty Rock Asphalt Co. is doubling the capacity of its plant at Liberal, Mo. Heavier machinery is replacing some of the old equipment, and a new roll crusher is being installed.

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## Four Long Island Gravel Producers Consolidate

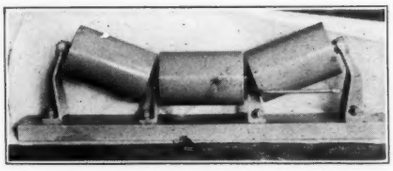
Four Long Island sand-and-gravel companies recently merged resources, the new concern being known as the Local Sand & Gravel Co., with offices at Mineola. The firms included in the merger were Hendrickson Bros., Inc.; Geo. H. McLeod Corp.; Seaford Sand & Gravel Corp.; Westbury Sand & Gravel Co.; and C. V. Service, Inc.

# New Machinery and Supplies

## Conveyor Idlers Employ Renewable Pulley Shells

A series of conveyor-belt troughing and return idlers equipped with Timken roller bearings has been brought out by the C. O. Bartlett & Snow Co., Cleveland, O. The bearings of each pulley are provided with a positive screw adjustment so arranged that wear may be taken up without removing the pulley from the supporting brackets.

Provision is made for renewing the pulley shells without destroying the pulley ends, which are made of cast iron. These renewable shells are made from seamless steel tubing, ¼ in. thick and 6 in. in diameter. The use of uniform tubing results in a well



Conveyor belt idler with renewable pulley shells.

balanced pulley, said to reduce belt wear by virtually eliminating slippage over the pulley.

Four brackets, mounted on an inverted steel channel, support the three pulleys of the troughing idler, which provide a continuous support across the belt except for a ¼-in. gap between pulleys. Open tops in the brackets permit any pulley to be removed without disturbing the bracket or adjacent pulley. The single pulley of the return idler is similar to the pulleys of the troughing idler; its brackets, however, are of the hanging type.

A single grease fitting serves to lubricate the two bearings of each pulley in the troughing idlers. The longer return idler pulley has a fitting for lubrication at each end. A central tube prevents the escape of grease into the pulley interior. As the flow of grease is toward the outside, the bearings are flushed as they are greased. The bearings are further protected by four-pass metal labyrinth seals.

The Series 40 troughing and return idlers are offered in nine sizes for belt widths ranging from 18 to 60 in.

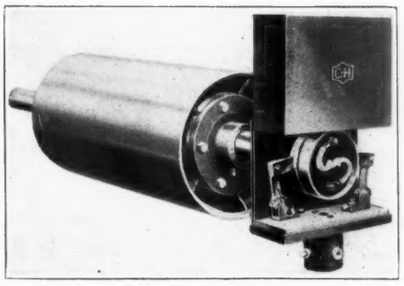
## Continental Builds New Series of Four Engines

Deliveries are shortly to be made of another new series, in four sizes, of Continental 6-cylinder, L-head engines to be known as the E-600, according to L. J. Kanitz, general sales manager of Continental Motors Corp. This group, designed for high speed and performance, yet of comparatively low weight, in no wise supplants any of the present Continental models but, on the other hand, it provides an even more closely graduated series between the well known Model 16-C and the heavier R-series of overhead valve type.

All of the new engines are of 4½-in. stroke, but the bores are 3 11/16, 3⅞, 4⅛ and 4¼-in., with displacements of 288.3, 318.0, 360.7, and 382.9 cu. in., respectively. Several striking features of design in manifold, camshaft, and combustion chamber have resulted in a happy combination of unusually high torque characteristics over a wide speed range. At the same time strength and sturdiness have been coupled with low weight. Full provision has been made in the basic design for all the current accessories, such as oil filter, air cleaner, air compressor, etc., and for dual ignition.

## New Magnetic Separator Pulley Simple in Design

Simple construction, better wearing qualities and lower price are features of the new Type W magnetic separator pulley recently announced by Cutler-Hammer, Inc., Milwaukee, Wis. The new pulley has only three major parts, a machined, cast-steel spool, the magnet coils and a coil shield, with the necessary insulation. The magnet coils are wound on the steel spool and vacuum-impregnated to make them moisture proof. The coil shield is then welded to the spool so that it com-



Magnetic separator pulley with cover in raised position.

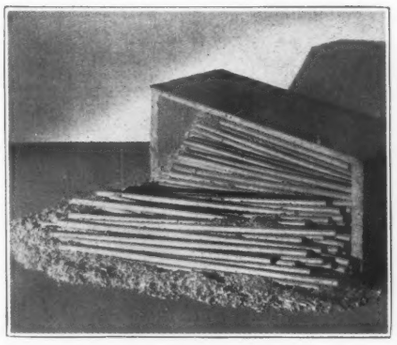
pletely encloses the coils. This coil shield is of Allegheny metal which provides a tough, long-wearing, non-magnetic pulley surface.

The commutating mechanism, which conducts the current to the magnet coils, is mounted on one end of the pulley shaft. Heavy brass collector rings and carbon brushes assure good contact at all times. A dust-proof cover protects the commutating mechanism from dust and other flying particles and protects operators from accidental contact with live parts.

These new magnetic separator pulleys are made in 12-in. diameter sizes in six lengths for belt widths varying from 12 in. to 30 in.

## Hard-Surfacing Products Developed by Coast Firm

A group of new hard-facing products for application on friction surfaces has been developed by Armite Laboratories in Los Angeles. These are for application with the electric arc and by the oxy-acetylene method. The laboratory has developed several grades of inserts and compounds ranging in size from the smallest 20-mesh to ½-in. diameter for application to drilling bits, shovel-dipper teeth and for other services where inserts are desirable. The company has also de-



Rods for hard-surfacing machinery.

veloped a new product which is a tungsten carbide compound that can be applied direct to any type of steel and by special application to manganese. This product, known as Armite Arcweld, is applied with an electric arc using a negative carbon electrode. The same material in tube form, known as Armite Autoweld, is also being introduced.

The laboratory, in addition to manufacturing materials of diamond-like hardness, has also developed a hard-facing rod claimed to be of lighter weight than rods heretofore placed on the market so that more surface is covered per pound. This hard-facing rod is made in three grades of varying hardness.

An attractive catalog listing the new products has been issued and can be obtained from Armite Laboratories, 318 West 9th St., Los Angeles.

## Short-Center Belt Drive Cuts Power Consumption

Of special interest to operators of plants in which machines have independent short-center belt drives are certain recent developments by different manufacturers.

In any belt drive—flat or V—the transmission or power depends upon the grip between the belt and the pulleys. This grip multiplied by the tension in the belt gives the amount of power transmitted. For the most efficient results, the tension should remain uniform throughout starting and

regular service, up to the capacity of the motor.

The Kritzer Co., Chicago, Ill., furnishes what is known as the Floating motor drive. The name of this device is derived from the slogan, "The motor floats on the load." As shown in Fig. 1, the motor is mounted on this drive and is so pivoted that both the weight of the motor itself and the torque between the rotor and the motor frame exert tension in the belt. The position of the motor on the device is adjustable.

Fig. 1. Floating motor on short-center belt drive.

The short-center belt drive made by the Rockwood Mfg. Co., Indianapolis, Ind., likewise utilizes the motor's weight and torque in maintaining a uniform pull in the belt, as shown in Fig. 2.

These devices are extremely simple in construction and in installation. Different models are furnished for floor, ceiling and wall mountings but all are economical of space. Once installed such a drive will perform perfectly with scarcely any attention.

When a motor that is mounted upon one of these drives is at rest, nonoperating, considerably less tension is exerted upon the belt than when it is running under regular service. When power is applied, the inertia of the driven machine causes the motor's torque to revolve the motor and its base about the pivot thereby putting extra tension in the belt during the starting period. Then, after the motor attains its normal operating speed under load, it returns to an intermediate position in its swing where it thereafter maintains correct belt tension for best continuous operation.

Such drives are comparatively light in weight and are inexpensive in first cost. They have no upkeep expense. They can be obtained for all relative positions of motors and driven units so long as the driven shafts are not lower than the motor shafts. They obviate the necessity for tension pulleys and they assure permanent alignment and longer belt wear. They are available in motor capacities of from ½ hp. to 50 hp. but are especially recommended for the smaller ratings.

To be best appreciated one of these short-center drives must be observed in service. As speed or load are varied, the motor will move in a short arc around its pivoting support in such a way as to maintain a tension in the belt that is proportionate to the requirements.

Flat leather belts can be run on paper pulleys whose center distances are so short as to barely allow clearance between the pulleys, and the drive will have the same high efficiency, long life, and low maintenance costs as the standard long-center drives. A saving in power consumption is claimed by the manufacturers.

The belt never requires shortening as the pivots are adjustable for belt stretch without stopping operations. After installation, such a drive requires almost no attention. The bearings of the motors are never subjected to excessive pressures with attending troubles. One of these bases merely takes the place of the usual motor rails.

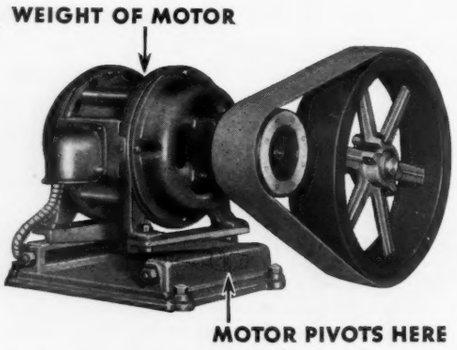



Fig. 2. Phantom view showing motor pivot on another drive.

## Portable Air Hoist Has 2,000-Lb. Rated Capacity

A larger and more powerful air hoist, known as the Type HU, has been added to the line of hoists manufactured by the Ingersoll-Rand Co., New York. This new hoist has a rated capacity of 2,000 lb. at a rope speed of 120 ft. per minute, but it will safely handle loads greater than this. The cable capacity is 550 ft. of ⅝-in. cable.

The hoist is suitable for use wherever a portable hoist of this capacity can be employed. It is used for skidding and hoisting timbers, handling tools and other material, hauling and spotting cars, single-cable slushing work, etc. The hoist has a high overall efficiency and remarkably low air consumption.

The base is a heavy, cast-steel plate, provided with holes for bolting to any flat surface and is also grooved to fit columns to which it can be clamped.

A reversible four-cylinder, radial-piston-type air motor is used that is accurately counterbalanced. It is simple and rugged in design and will stand up under severe service. Ample lubrication is provided for all working parts. Ball or roller bearings are used throughout.

New utility air hoist.

A clutch of the jaw type is provided for engaging or disengaging the motor with the drum. The brake is of the external contracting type.

The weight without cable is 490 lb., length 32 in., width 22 in., and height 23 in.

## Squirrel-Cage Induction Motor Uses Stock Parts

In the design of a new W-frame type CS squirrel-cage induction motor, the Westinghouse Electric & Mfg. Co. has incorporated an important innovation in motor design: making the different parts of the motor as entirely separate units. Having adopted the separate parts idea, the company has only to keep the number of standardized parts in stock to be able to build, on short notice, a motor for a specific application. The new design makes maintenance simpler and less expensive, because damaged electrical parts can be replaced without replacing or rewinding the motor.

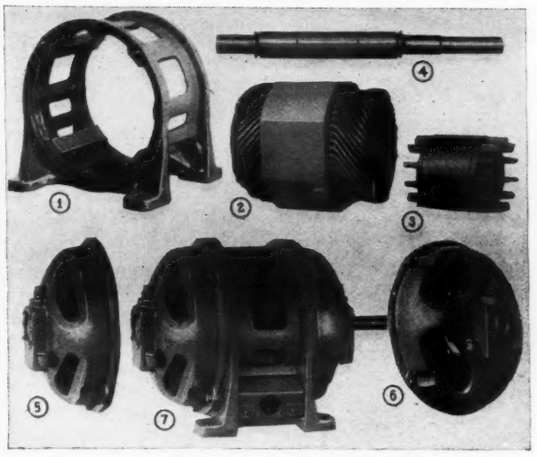
In the new induction motor the stator core containing its winding is pressed into the motor frame. When it becomes necessary to replace a damaged winding, the old core and its winding is pressed out as a unit by means of an ordinary arbor press, and a new "pre-wound" core pressed in; then, after the motor is reassembled, it is ready for use, the entire operation

of replacing the damaged winding usually having been performed in less than an hour.

Like the stator core and its winding, the rotor is a complete separate unit; and both the rotor and the stator core and winding can be supplied as such for built-in motor or repair purposes. This feature makes it possible to vary the electrical characteristics, using the same set of mechanical parts; and, with a given set of electrical parts, the mechanical construction can be changed in almost numberless combinations.

The separate - frame construction makes it possible to supply any one of a number of different types of frames to meet the needs of the customer. The brackets are bolted to the frame with a ring-groove fit that automatically and permanently sets the air gap and aligns the bearings, simplifying reassembly.

To give an idea of the myriad applications of this motor, without presenting the great number of mechanical variations possible, some of the ramifications obtainable with the various motor parts are as follows: vertically-mounted or horizontally-mounted motors; motors without feet vertically-mounted or flush-mounted against the side of the machine; and open, semi-enclosed, and totally-enclosed motors. The accompanying illustration shows the standard cast frame (1); standard pre-wound core (2); standard die-cast rotor (3); sealed-sleeve bearing shaft (4); standard sealed-sleeve bearing brackets (5) and (6); and the new type CS motor (7).




New squirrel-cage motor and its separable parts.

## Sturdy Construction in New Drag-line Bucket

A new drag-line bucket is being marketed by the Erie Steel Construction Co., Erie, Pa. Many new features are claimed by the manufacturer, making this bucket a better drag-line at every point.

The bucket is suitable for every kind of drag-line work, and is light in weight yet sturdy in construction. This is accomplished by improved design, thus eliminating all unnecessary weight.

Perfect balance is a feature. This is obtained by locating the center of gravity with relation to the hoist trunnion brackets so that at all stages of operation the bucket is well balanced.

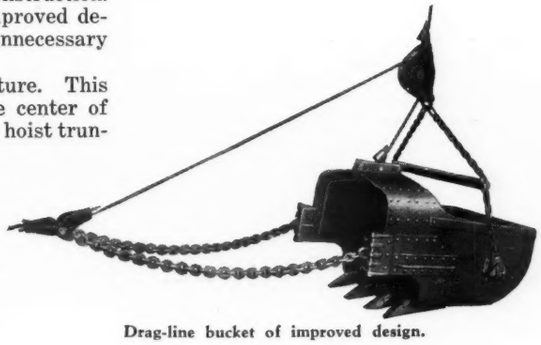
A light pull on the dump line holds the bucket in a carrying position and when released the bucket dumps quickly and freely.

The illustration shows the rugged construction of the bucket. Extra strength is built in where it will do the most good. For example, the bridge is built to keep the sides from pulling in. It ties in with the lip and side plates, thus eliminating all chances of failure at this common point of weakness.

The hitch plates are heavy steel castings overlapped by reinforcing plates and angles and are interlocked with the base of the bridge and the ends of the lip. Corner connections are flanged to obtain the maximum strength, thus providing for all possible strains when the bucket is in action. Rivets are used throughout and are machine driven to remain tight and keep the bucket absolutely rigid.

A one-piece back band is tied into the bridge and welded and riveted to the side plates. This greatly adds to the strength of the side and end plates. The drag chain is made up of electrically-welded links to give extra strength, and is provided with a socket for the drag cable and a guard to the fair-lead sheave. Alloy-steel renewable reversible teeth and alloy steel heat-treated lips are regular equipment of these buckets.

The bucket comes complete with chains ready for attaching to the drag-line machine, and its performance, material and workmanship are guaranteed.



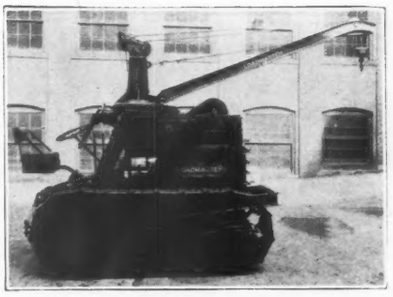
Drag-line bucket of improved design.

## Fast, Mobile Crane Has Boom Swing of 360 Deg.

Bucyrus-Erie Co. of South Milwaukee has taken over the manufacture and sale of the Loadmaster revolving-boom crane formerly sold by Frederic H. Poor, Inc., New York, N. Y.

This mobile crane with a boom swing of 360 deg. has a rated capacity of 3,500 lb., although much heavier loads can be handled under special conditions, and a maximum working reach of 14 to 16 ft. The machine may be mounted either on crawlers or on rubber-tired wheels, in the latter case having the maximum traveling speed of approximately 11 miles an hour.

The Loadmaster crane can serve many purposes. It can be used as a stationary revolving-boom crane, as a crane traveling with its load or as a tractor.



The revolving-boom crane.

Its extreme mobility and ease of handling give this one-man crane a very wide field of usefulness.

## Special Truck for Use in Quarries Developed

The Hug Co. has announced a new Hug Roadbuilder designated as Model 99 and offered as a specialized quarry truck. This truck is equipped with a 10-cu. yd. specially designed body built by the Easton Car & Construction Co. It has a pay-load capacity of 30,000 lb. and a Buda heavy-duty six-cylinder truck engine, 4¾ in. by 6 in., developing 126 hp. at 1,850 r.p.m. The transmission consists of a unit 4-speed transmission and a 3-speed auxiliary transmission, making possible 12 speeds forward and 3 speeds in reverse. The wide variation in operating speeds gives the truck an unlimited amount of power in low gear and, at the same time, provides an operating speed of approximately thirty miles per hour in the overgear drive. The tire equipment consists of Overman heavy-duty cushion tires 40 in. by 16 in. on each of the rear axles and 36 in. by 8 in. on the front axles. The frame is a 9-in. I-beam section. Each of the two heavy-duty double-reduction rear axles is a driving unit.

The 10-cu. yd. body is of ⅜-in. plate steel with a reinforced bottom of 3-in. oak sills covered with a ½-in. plate. The sills and the plate absorb the

New quarry truck with body in dumping position.

shocks caused by the dumping and dropping of heavy sharp rock. A special Woods W8 hoist is furnished with the body.

The Hug Co. has delivered four of these trucks to the Louisiana Quarry Co., Inc., at Winnfield, La. These trucks operate under 3-cu. yd. shovels and deliver the rock to the crushing plant.

A distinctive feature of the Model 99 Hug Roadbuilder is the set-back front-wheel design which makes possible a comparatively short wheelbase and distributes the load over all six wheels. It is another example of Hug specialization and the building of trucks to meet a condition.

## Belt Fasteners Insure Joints Without Leakage

When the photographer climbed up to take the accompanying belt-conveyor photograph he found a puddle of water over the joint. It had rained the previous evening. Obtaining a broom he swept out most of the water, but a little still remained to prove the manufacturers' claim that Flexco HD belt fasteners make a butt joint that is tight, not only preventing leakage of solid materials through the joint, but liquids as well.

This 48-in. belt handles 600 tons of crushed stone, coal or lime per hour with a maximum capacity of 1,000 tons. It operates at a speed of 450 ft. per minute, and is joined with Flexco HD belt fasteners which are manufactured in steel or non-rusting Monel metal by the Flexible Steel Lacing Co., 4623 Lexington St., Chicago.

Conveyor belt showing the leakproof joint.

## Maryland Quarry Finds Tractor Indispensable

The McMahon Brothers, in their quarry at Mt. Washington, Md., use a Caterpillar Thirty as a "handy-andy" or all-purpose tractor unit. It is used with scrapers, for assisting the trucks in and out of some difficult places around the quarry, and for removing the overburden. Due to the flexibility of the tractor, it is ideal for removing the earth which is embedded around the rock pocket of the quarry, as it is essential to have all the earth removed from the rock before same is blasted or worked into shape for either building stone or crushed stone for concrete construction.

Tractor handling large piece of stone in the McMahon quarry.

McMahon Brothers are well pleased with the tractor as same has been working for about three years in this quarry, and the repairs on the machine have been quite low.

## Cement Company Issues New Concrete Handbook

Useful and up-to-date information on concrete, both plain and reinforced, is contained in the new *Handbook of Concrete Construction* just issued by the Universal Atlas Cement Co., subsidiary of United States Steel Corp. The book is written from a practical rather than a technical standpoint. It makes no attempt to cover the field of large construction projects requiring skilled technical handling but it is a pocket manual of general information.

Beginning with a concise discussion on concrete as a construction material, the first chapter is devoted to making good concrete. It traces, step by step, methods of mixing, placing and curing concrete on the average job. This includes consideration of materials, equipment and labor and a clear presentation of the water-cement ratio method. In the second chapter the basic rules of reinforcing concrete are briefly presented. The remaining three chapters discuss forms for concrete, construction of small concrete structures and simple rules for estimating quantities and costs.

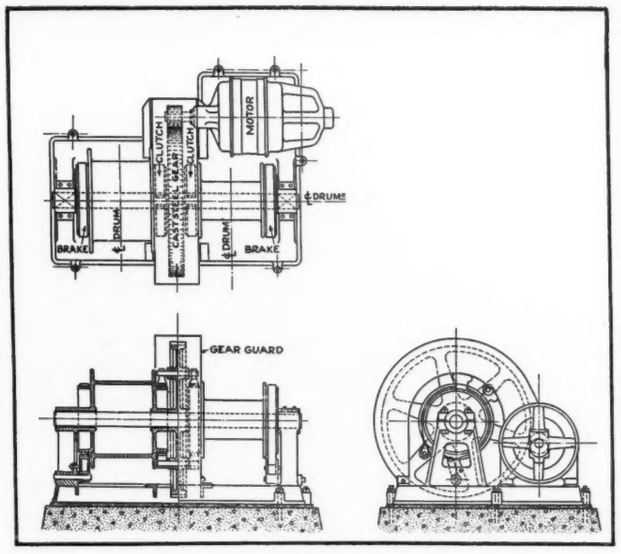
The book has 208 pages, is well illustrated, and contains 48 accurate, easily-read tables on quantities, sizes, loads, and so on. It has an excellent index. Copies are available to contractors, engineers and others to whom the book is of interest. Requests should be addressed to Handbook Department, Universal Atlas Cement Co., 208 South LaSalle St., Chicago, Ill.

## Free Book Will Help to Solve Trackage Problems

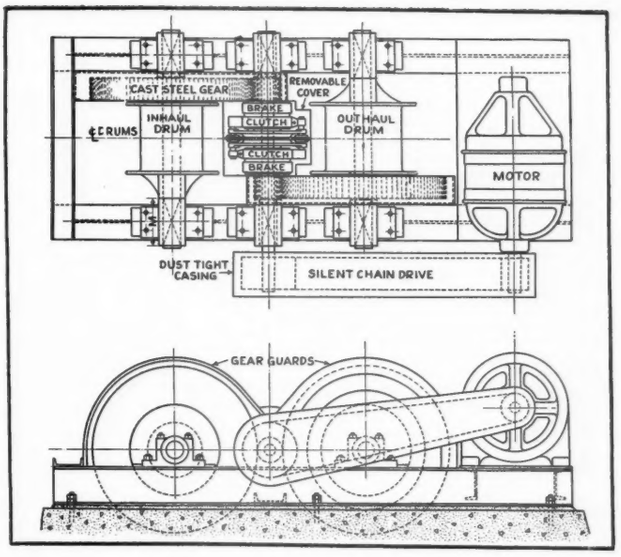
To enable operators of cement, sand and gravel, and crushed-stone plants to solve their trackage problems, the L. B. Foster Co., dealers in rails and complete track equipment, has produced a book of 124 pages which covers the subject in a thorough manner.

For instance, in the section on frogs, simple rules and diagrams for measuring angles are given to enable the operator to specify the correct type and size. Another section gives useful information on the installation of switches and switch ties. Many tables and easily-understandable sketches throughout the book make the volume of especial value for quick reference whenever an installation or replacement of track or track equipment is contemplated.

The 124-page book will be sent to any pit, quarry or plant executive free of charge. The address of the L. B. Foster Co. is Box 110, Pittsburgh, Pa., and the book is designated as Publication 161.




Electro-auto hoist with parallel drums.




Model of hoist with tandem drums.

## Electro-Auto Hoist for Operating Drag Scrapers

An electro-auto hoist has recently been developed and placed on the market by R. H. Beaumont Co., Philadelphia. The new hoist, developed exclusively for the operation of drag scrapers, is of especial interest to sand-and-gravel producers. Essentially, the Beaumont electro-auto hoist is a double-drum, two-speed hoist, the high speed for the outhaul being secured by using a larger drum. The motor is a reversible slip-ring type, connected to the hoist by means of a gear drive or silent chain, depending on the size. Power is applied to the drums through one-way band-type clutches. When the motor is reversed, one clutch automatically engages and the other disengages, the two clutches being interconnected so that they must act together at all times. The rotation of the motor in one direction connects one drum only, the other drum being automatically declutched. The free drum in either case is under the control of the automatically-applied brake which is similar in design to the one-way type clutches. There is a separate brake for each drum, its purpose being to prevent the unwinding drum from running faster than the cable is being payed out. These brakes are arranged so that when one is on the other is off.

Due to the fact that the improved scraper-winding machine has automatic clutches and brakes which are automatically applied by a change of rotation of the shaft, the operator is free of all the burden of manually applying clutches and brakes and can be stationed anywhere that the controller wires can be led. All he has to operate is a small, master-drum switch and he can, therefore, be located at any point which will give him a view of the scraper at all times, regardless of the location of the hoist.

The use of a reversing slip-ring motor permits the scraper to start digging at a very low speed which gradually accelerates up to about 200 ft. per min. until the scraper has secured its load, when it automatically accelerates to 300 ft. per min. the instant the digging operation is completed and the scraper is "floating on its load." This cannot be done by the usual scraper hoist where a continuous non-reversing motor must be used. The empty scraper is returned at 600 ft. per min.

Actual capacities that can be secured with this hoist are said to be far higher than can possibly be obtained with the old style of operation. The factors that insure this greater capacity are real, not imaginary. For instance, the operator merely turns his remote control switch. This acts instantly and directly at the source of power and as a consequence the scraper stops immediately. Dut to this instantaneous stopping, there is no drift of the scraper such as occurs after the operator starts to throw the old-style clutches. This drift is caused by the sluggish releasing of the clutch, which slips but still applies some pull to the scraper until it is fully released. In the Beaumont system, slipping clutches do not exist. There is no shock because the clutches engage before the motor gains speed.

An important feature in the application of remote control is that the operator is as fresh at the end of the day as at the start. No relief is necessary. He can keep the equipment going at top speed all day long. No particular skill is required to operate the new style hoist. Any man who can turn a handle can operate it. The skill is built into the automatic devices on the hoist.

The use of a reversing motor allows the scraper to pick up its load at low speed while the motor is attaining its full speed. During this short period, the motor is exerting torque (pull) at its maximum. The instant the scraper is full and starts floating on its load, the motor reaches full speed and hauls the load at a speed 50 per cent greater than the average digging speed.

In practically all cases, it is possible by this system to secure the capacity that would require the next largest size of the old style. For instance, a ¾-cu. yd. Beaumont system does 40-cu. yd. per hour at a 200-ft. haul but, with the old style, a 1-cu. yd. outfit is required for this capacity. In the larger sizes, a 3-cu. yd. new style does 164-cu. yd. per hour at 200 ft., but an old style 4-cu. yd. at the same haul only does 152-cu. yd. per hour.

The hoist comes in four sizes, with drums from 15 in. to 28 in. in diameter.

## Catalina Island Quarry to Supply Harbor Stone

The Catalina Island Co. has reopened its quarry to supply 80,000 tons of rock for harbor improvements at Los Angeles. The quarry is located 11 miles from the city of Avalon and is operated by the Los Angeles department of harbors under lease.

## District Sales Manager of Alpha Portland Dies

A. Dale Staples, district sales manager for the Alpha Portland Cement Co., died April 17 at a hospital in Battle Creek, Mich. Funeral services were held in Battle Creek, April 19. Burial was at South Bend, Ind.

The W. T. Walsh Equipment Co., Cleveland, O., has been named local distributor for the following equipment lines: Ohio power shovels, Butler bins, Ohio crushers, Deister Leahy screens, Foote paving mixers, Huber road rollers, Gardner-Denver compressors, Jaeger pumps, and Lakewood finishers.

# Legal Information for Operators

## Recent Court Decisions Involving Motor Trucks

IT is well settled that one who is the general servant of another may be lent or hired by his master to another for some special service, so as to become the servant of the hirer. As to which the original employer or the hirer is liable for acts of the employee, the test is whether, in the particular service the employee is engaged to perform, he continues to be under the direction and control of the original employer or becomes subject to that of the party to whom he is let or hired.

For instance, in B. & B. Material Co. v. Winston Bros. Co., 290 Pac. 839, it was disclosed that a company hired from the owner of motor-trucks several vehicles with their drivers at $2.50 per hour for the performance of certain work. A part of the work consisted of the removal of rock and other material on the banks and in the bed of a river. The material, preparatory to removal, was loosened by blasting. It was then gathered up by a steam shovel and loaded into dump trucks, in which it was carried to a dumping ground and there deposited. The place selected as a dumping ground at the time here in question was on the top of a somewhat steep declivity. The trucks, on reaching the declivity, were turned and backed to its edge, then the material was dumped over the edge. One day a truck accidentally was driven backward over the edge of the bank and it was destroyed. The owner of the truck sued the company for its value. In holding the company liable the Court said:

"The truck was as much under the direction and control of the appellant (company) while operating on the work as it would have been had the appellant (company) been privileged to employ its own driver. . . . Since we conclude that the driver of the truck was the servant of the appellant (company) and not the servant of the respondent (owner of truck) during the period the truck was actually used in the prosecutlon of the work, it follows . . . that the appellant (company) is liable for the loss of the truck even though it was lost because of the negligence of the driver."

### Duty of Motor-Truck Driver

It is interesting to observe that, in Hickerson v. Jossey, 283 Pac. 1119, a higher Court clearly explained the duty of a motor-truck driver, and instructed a jury, as follows:

"If you find that a reasonably careful and prudent driver, under all of the conditions prevalent at the time this collision occurred, in the exercise of ordinary and reasonable care and caution, would have had his car under such control as to have been able to have stopped the same within the range of his vision, and if you further find that the driver of the car causing the injury was not operating his car at such a rate of speed under the circumstances then existing so that he could stop the car within the range of his vision, and by reason thereof, the collision occurred, then I instruct you that the driver is guilty of negligence."

### Safeguarding Pedestrians

The rule of law is established that the traveling public has a right to presume that there is no dangerous impediment in any part of the highway or sidewalk. This principle applies to all interferences with safety of travel arising from temporary uses of the highway or sidewalk that are not normal and it relieves persons passing along the highway from any obligation to look for such interferences with travel. On the other hand, a pedestrian is not entitled to recover damages where the evidence clearly indicates that the injury resulted from negligence of the injured person.

For example, in Nerney v. Stanley, 150 Atl. 370, the evidence showed that a woman, who was walking on a sidewalk, saw a motor-truck loaded with non-metallic products standing at the curb. She did not observe that a chute in the sidewalk was open for receiving the load in the truck and she fell into it. She sued to recover damages, contending that a warning should have been given of the dangerous condition. The Court held the injured woman not entitled to damages, stating the following important law:

"We are not unmindful of the line of decisions holding that a person walking along the sidewalk of the public street is not bound as a matter of law to look out for obstructions in the nature of a nuisance; but in the present case that rule is inapplicable, because . . . where the pedestrian had notice of an unusual condition, saw it in fact, and was thereby charged with the duty to exercise reasonable care to avoid injury, cannot be denied that reasonable care required visual scrutiny, and yet the plaintiff said she did not look for any hole at the place in question, it was her duty to do so in the circumstances present."

### Compensation Allowed

Generally speaking, the Courts hold that any employee injured while performing his regular duties is entitled to compensation. This rule is applicable although the injury is not apparent for several days or weeks after the occurrence of the accident.

For illustration, in Woll v. Hensel, 230 N. W. 813, it was shown that a truck driver had been for six months employed at a weekly wage of $21. He was 59 years of age and weighed 210 pounds. While he and another employee were lifting a rock weighing over 300 pounds to a height of three feet he received an injury causing a hernia on the right side which was not discovered by the employee until he was examined by a physician some time afterward. The lower Court refused compensation on the ground that the employee could not prove that he had suffered an accidental injury arising out of and in the course of his employment with the company. The driver appealed to the higher Court, which held that he was entitled to compensation.

On the other hand, it is important to know that an employee cannot obtain compensation or damages unless the complaint is filed without undue delay.

## Contract Held Void if Not Properly Recorded

Under the bankrupt laws, all property, materials and tools belonging to a concern which goes into bankruptcy may be sold for the benefit of common creditors by the trustee in bankruptcy. However, if a man holds a mortgage on the materials or records a contract by which the former retains ownership to the materials until paid for, the situation is different.

For instance, in Commercial Casualty v. Williams, 37 F. (2d) 326, it was shown that a company contracted to perform construction work. The contract contained a clause stating that if the contractor should be adjudged a bankrupt the owner may give the contractor seven days' written notice and terminate the employment and take possession of all materials, tools, and appliances.

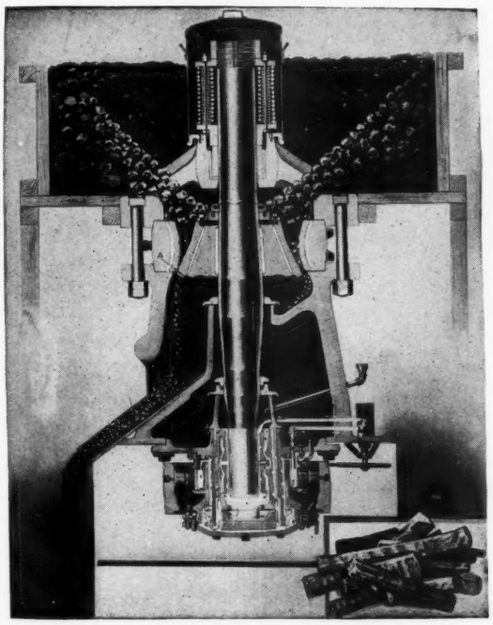
This contract was not recorded.

Before the work was completed the contractor was adjudged a bankrupt and the trustee in bankruptcy took possession of the tools and materials on the job intending to sell them and distribute the proceeds among the common creditors.

It is interesting to observe that, since the contract was not recorded in the county recorder's office, the Court held the trustee in bankruptcy entitled to sell all the tools and materials, saying:

"The mere fact that the county had the right to take possession of the premises and complete the work did not give it title to the materials which were on the ground and which had been purchased by the contractor. The title to these materials had vested in the contractor and the mere fact that the contractor breached his contract did not operate to vest the title to the materials. . . . The contract is void as against the trustee, because it would then be, in effect, a chattel mortgage not recorded."

# The Crusher with the Troubles Left Out



*Built in various sizes, with receiving openings from 4¼ to 14 inches. Produces sizes from ⅛ to 1½ inches, with capacity up to 620 tons per hour on larger sizes.*

## The Kennedy Ball-Bearing Gearless Gyratory Crusher

**is guaranteed to do more crushing, size for size, of any given material, with less power consumption, than any crusher ever built. The entire motive power is completely applied to crushing material as this crusher is operated without gears. The head and shaft of the type "S" crusher is suspended on springs, so that danger of damage by tramp steel is eliminated.**

**The eccentric is of the ball-and-socket type which permits the babbitt to last considerably longer than that of the rigid eccentric crushers, thus a great saving in maintenance cost is obtained.**

**The oil system, equipped with a filter, is of the continuous return type, which insures constant lubrication.**

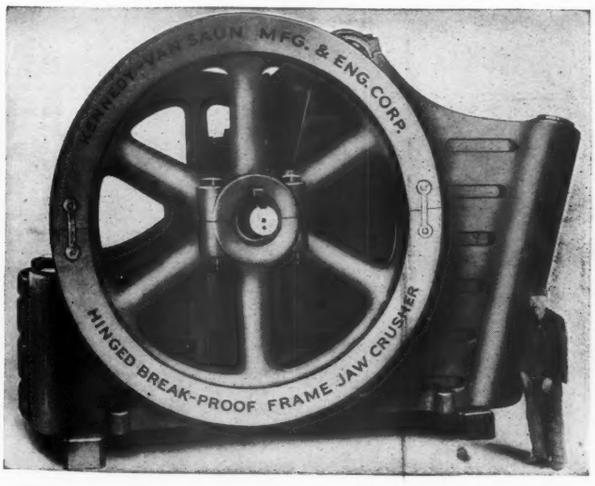
**Power requirements are kept to an absolute minimum because of the absence of friction, as the stone is broken instead of ground.**

**This crusher may be operated by a synchronous motor, built in the pulley of the crusher, or by a belt from a standard motor.**

## Kennedy Break-Proof Frame Jaw Crushers

**are built with jaw openings 10 x 7 inches to 96 x 66 inches, and are guaranteed against frame failure where a great percentage of the breakage occurs. Side frames are joined to back and front members by steel shafts, and no bolts are used to hold the frame rigid.**

**Positive lubrication is insured to all moving parts. These crushers will produce sizes from 2½ to 10 inches and have a capacity of from 8 tons to 1,000 tons per hour.**




*We manufacture a complete line of crushers, ball mills, rod mills, screening, elevating, and conveying equipment, etc. Literature concerning any or all of this machinery will be sent on request.*

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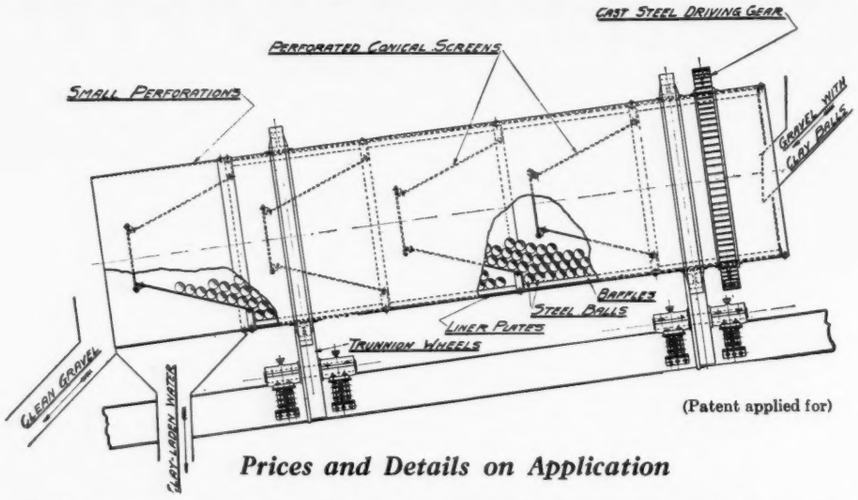
Positively removed in large quantities by the

# ALLSWEDE SCRUBBER




(Patent applied for)

*Prices and Details on Application*

Each Allswede Scrubber is designed to meet the requirements and capacity

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**F. M. WELCH ENGINEERING SERVICE, Inc., Greenville, Ohio**

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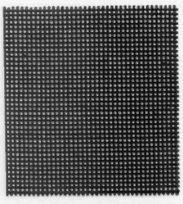
**THE GREENVILLE MFG. WORKS**



40 Mesh; .0135 Wire

2½ Mesh; .105 Wire

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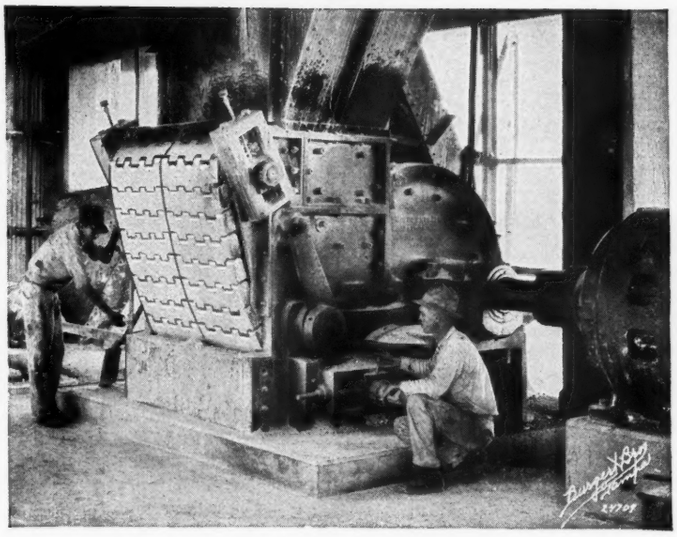

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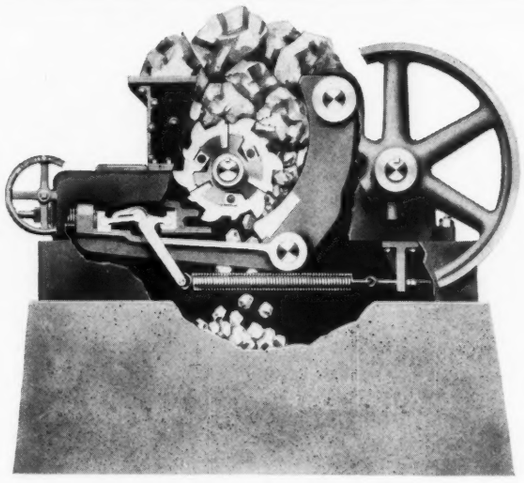

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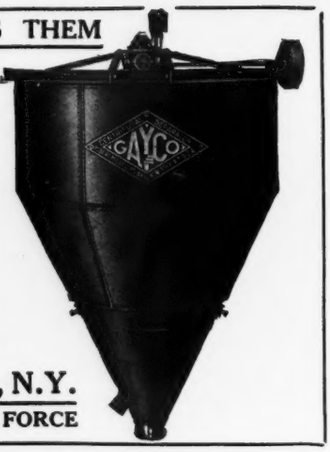


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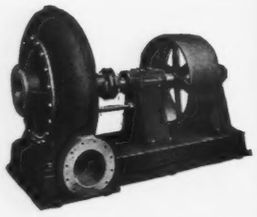

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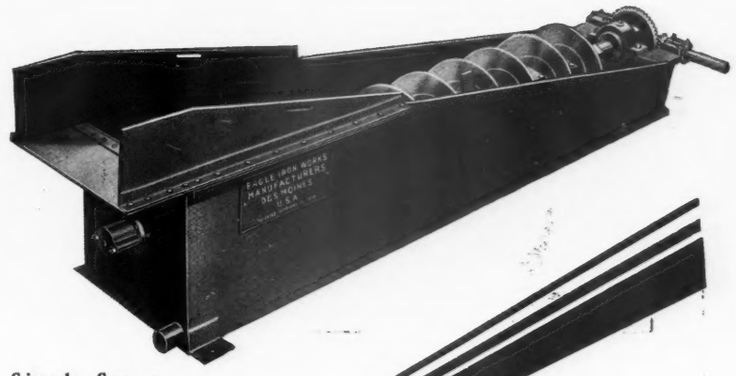

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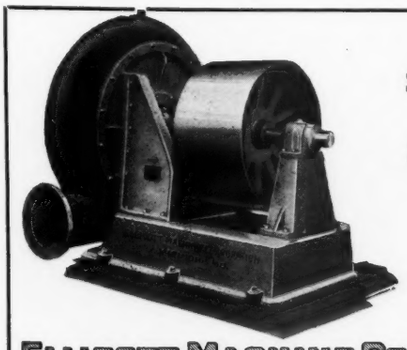

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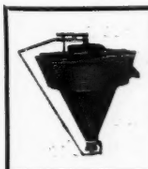

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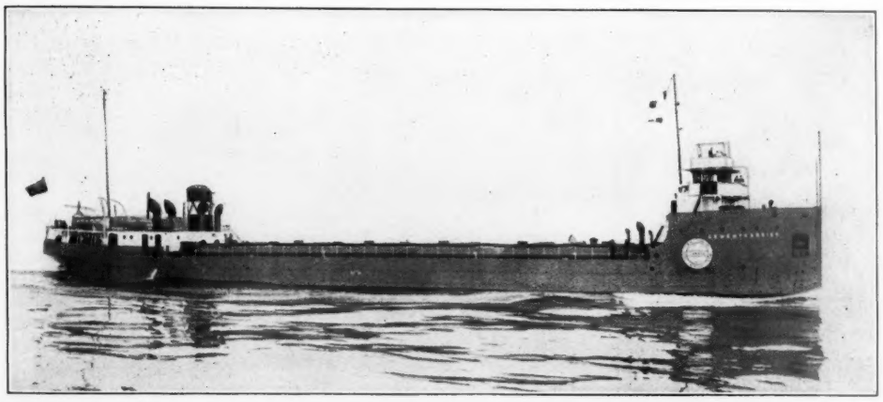

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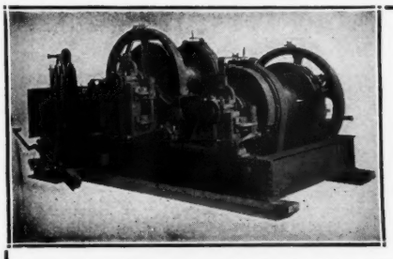

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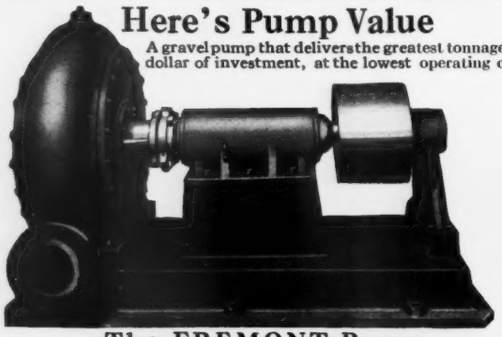

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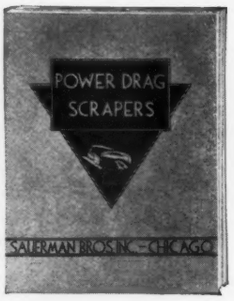


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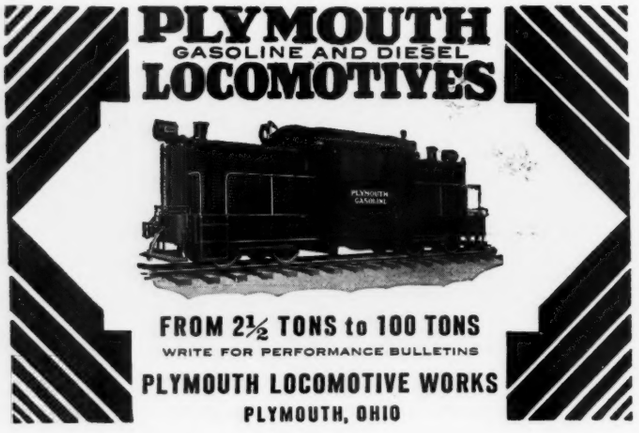

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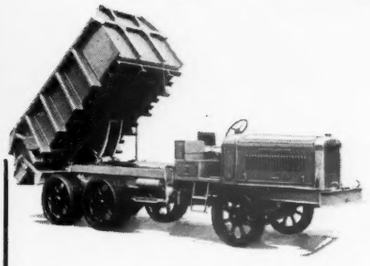

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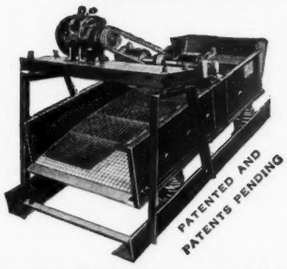


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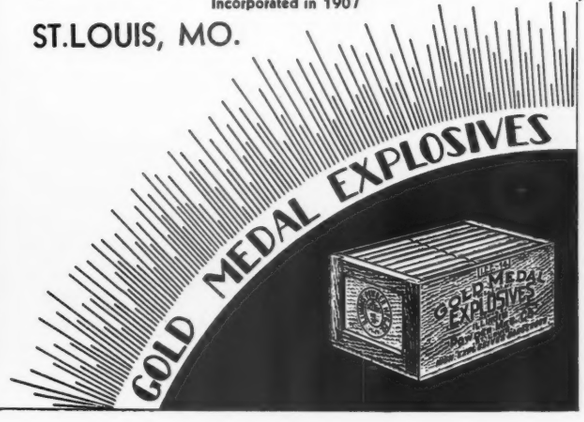


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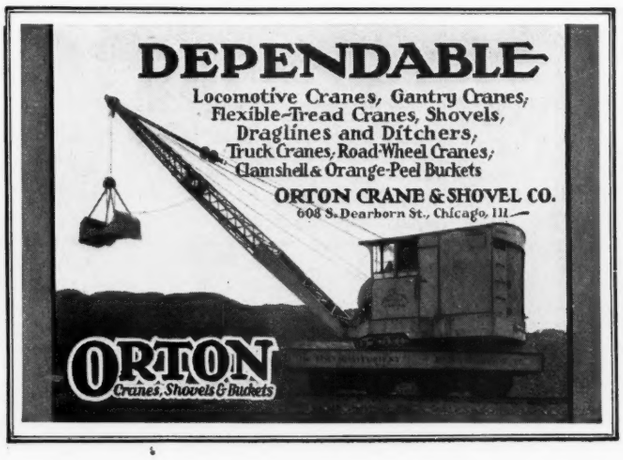

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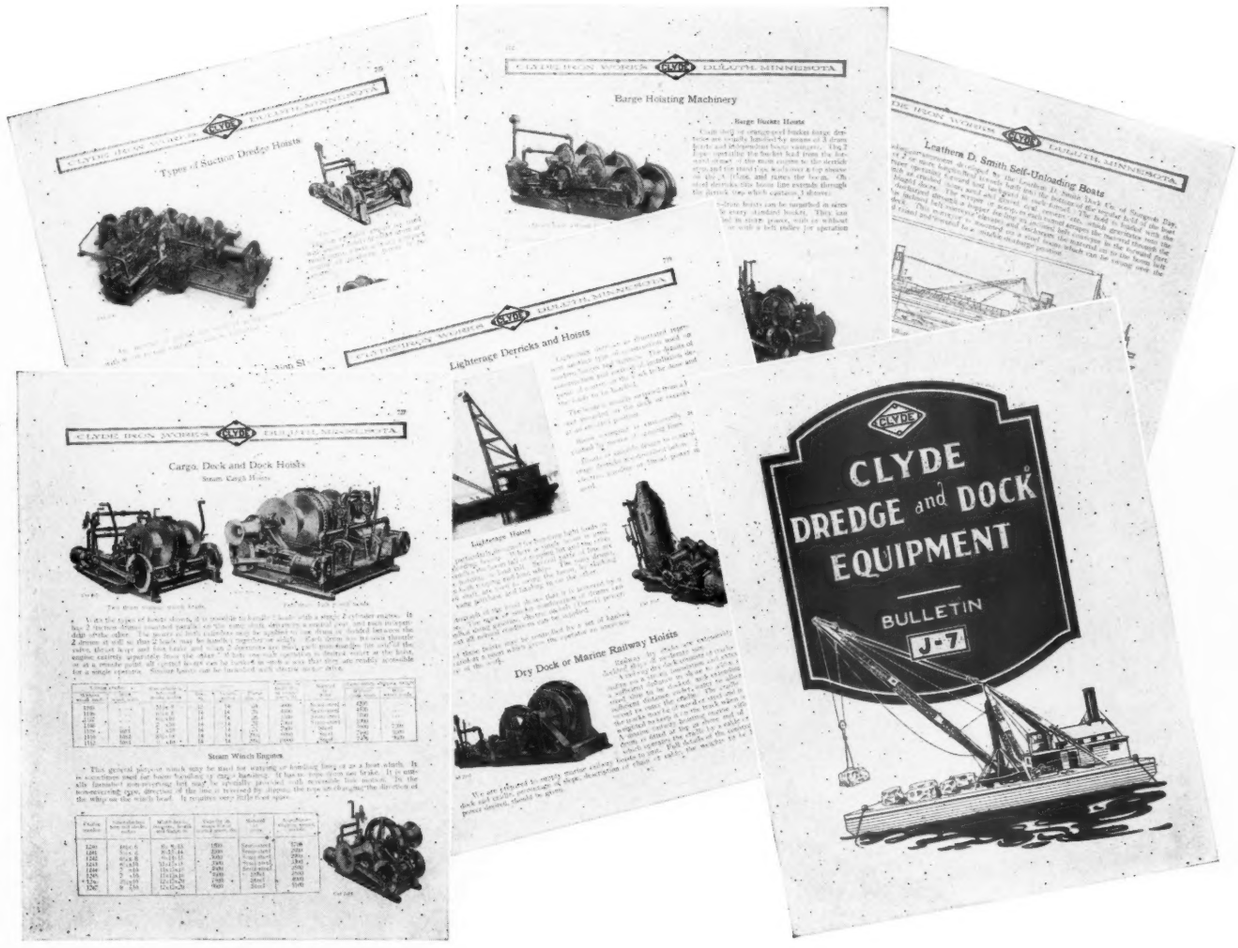


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